Technical Report EL-95-17
April 1995

US Army Corps of Engineers
Waterways Experiment Station

Evaluation of SWIFT/486 Model with Analytical Solutions

by Mansour Zakikhani

Prepared for U.S. Army Environmental Center

The contents of this report are not to be used for advertising, publication, or promotional purposes. Citation of trade names does not constitute an official endorsement or approval of the use of such commercial products.

Technical Report EL-95-17
April 1995

Evaluation of SWIFT/486 Model with Analytical Solutions

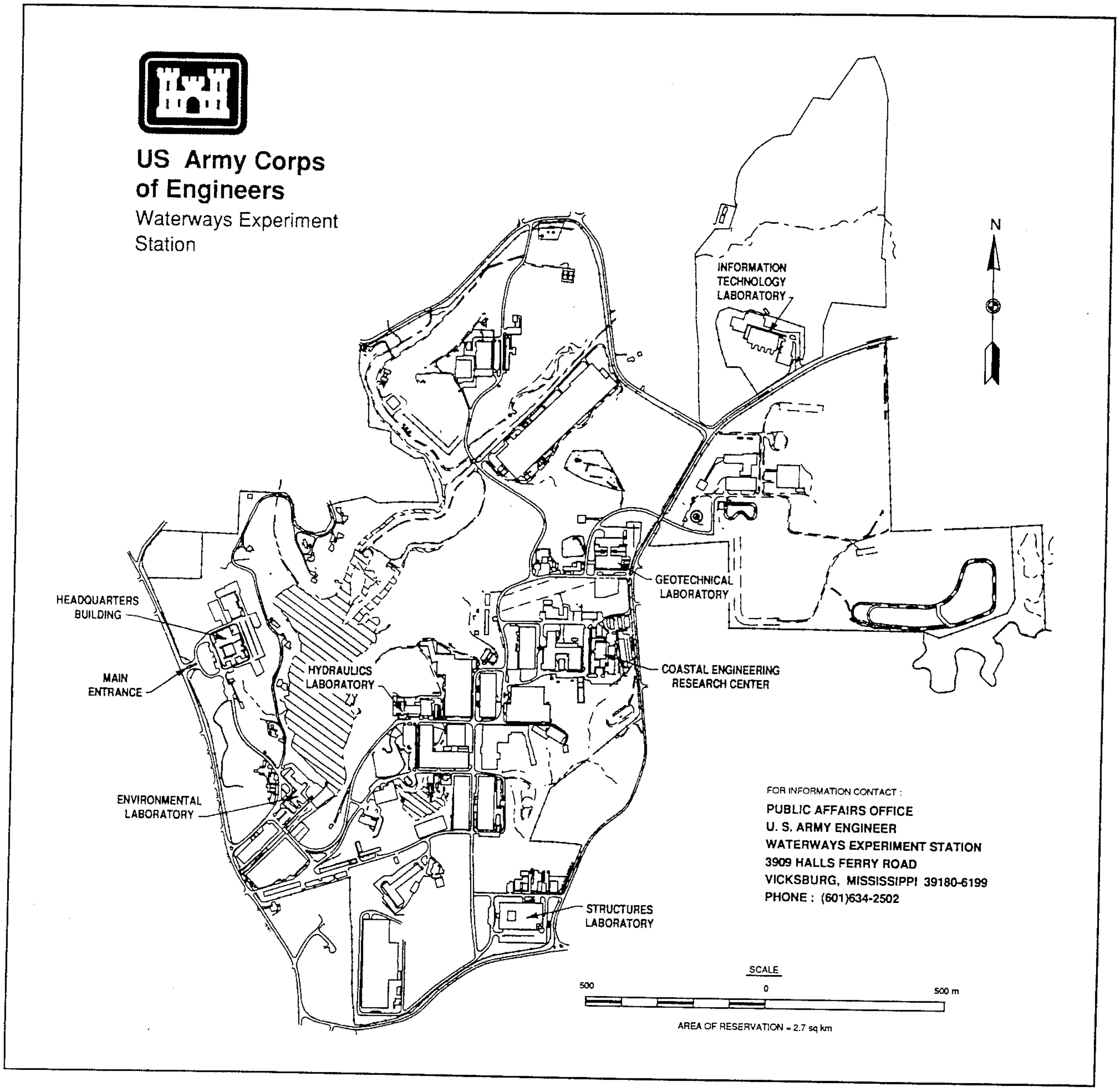
by Mansour Zakikhani

U.S. Army Corps of Engineers
Waterways Experiment Station
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

Final report

Approved for public release; distribution is unlimited

Prepared for U.S. Army Environmental Center
Aberdeen Proving Ground, MD 21010-5401



Waterways Experiment Station Cataloging-in-PublicationData

Zakikhani, Mansour, 1954-
Evaluation of SWIFT/486 model with analytical solutions / by Mansour Zakikhani ; prepared for U.S. Army Environmental Center.
314 p. : ill. ; 28 cm. — (Technical report ; EL-95-17)
Includes bibliographic references.
1. Groundwater — Mathematical models — Evaluation. 2. Groundwater — Computer programs — Evaluation. 3. Groundwater flow. I. United States. Army. Corps of Engineers. II. U.S. Army Engineer Waterways Experiment Station. III. Environmental Laboratory (U.S. Army Engineer Waterways Experiment Station) IV. U.S. Army Environmental Center. V. Title. VI. Series: Technical report (U.S. Army Engineer Waterways Experiment Station) ; EL-95-17.
TA7 W34 no.EL-95-17

Contents

Preface vii

1—Introduction 1

Purpose 1
Scope of Report 2

2—Model Description 3

Aquifer Submodels 3
Aquifer-influence function and boundary conditions 3
Initial conditions 4
Well submodel 4
Global, Local, and Primary Equations 5
Mass Balance Calculation 5
Numerical Considerations 6
Input File 7
Output File 8

3—Model Performance 9

Platform for Evaluation 9
Modifications for the Evaluation 9
Example Problems 10
Problem 1, Fully penetrating well in a confined aquifer 10
Problem 2, Fully penetrating well in a leaky aquifer with storage 12
Problem 3, Steady-state horizontal flow in a heterogeneous aquifer 15
Problem 4, Transport in a plane radial flow field 17
Problem 5, Transport from a continuous point source in a uniform two-dimensional flow field 20
Problem 6, Transport of a solute slug in a uniform groundwater flow field 26

4—Conclusions 33

References 36

Appendix A: Input and Output of SWIFT/486 Simulations A1

SF 298

List of Figures

Figure 1. Geometric parameters of the reservoir and aquifer in cylindrical geometry 4

Figure 2. Comparison of SWIFT/486 simulation results with analytical solutions for Theis radial problem 13

Figure 3. Results of SWIFT/486 simulation and leaky aquifer analytical solution 14

Figure 4. Schematic of domain with boundary conditions specified along the domain 17

Figure 5. Contours of hydraulic conductivity as function of x and z 18

Figure 6. Simulated SWIFT results and analytical solutions for inhomogeneous domain 18

Figure 7. Simulated SWIFT/486 results and analytical solutions for a radial solute transport problem with dispersivity coefficient of 0.3 m 20

Figure 8. Simulated SWIFT/486 results and analytical solutions for a radial solute transport problem with dispersivity coefficient of 0.15 m 20

Figure 9. Simulated SWIFT results and analytical solutions for a radial solute transport problem with dispersivity coefficient of 0.015 m 21

Figure 10. Simulated SWIFT results and analytical solutions for two-dimensional continuous source problem with DY = 30 m and retardation coefficient R = 1 23

Figure 11. Simulated SWIFT results and analytical solutions for two-dimensional continuous source problem with DY = 50 m and retardation coefficient R = 1 24

Figure 12. Simulated SWIFT results and analytical solutions for two-dimensional continuous source problem with DY = 60 m and retardation coefficient R = 1 24

Figure 13. Simulated SWIFT results and analytical solutions for two-dimensional continuous source problem at time = 2,000 days 25

Figure 14. Simulated SWIFT results and analytical solutions for two-dimensional continuous source problem at time = 2,800 days 25

Figure 15. Simulated SWIFT results and analytical solutions for two-dimensional continuous source problem with DY = 60 m and retardation coefficient R = 2 26

Figure 16. Simulated SWIFT/486 results and analytical solution for two-dimensional slug transport of a solute at time = 3.96 days 29

Figure 17. Simulated SWIFT/486 results and analytical solution for two-dimensional slug transport of a solute at time = 10.59 days 29

Figure 18. Simulated SWIFT/486 results and analytical solution for two-dimensional slug transport of a solute at time = 16.59 days 30

Figure 19. SWIFT/486 CPU time calculated for the simulations with NX = 40 and NY = 5 30

Figure 20. Simulated SWIFT/486 results and analytical solution for two-dimensional slug transport of a solute with NX = 40 and NY = 19 at time = 3.96 days 31

Figure 21. Simulated SWIFT/486 results and analytical solution for two-dimensional slug transport of a solute with NX = 40 and NY = 19 at time = 10.59 days 31

Figure 22. Simulated SWIFT/486 results and analytical solution for two-dimensional slug transport of a solute with NX = 40 and NY = 19 at time = 16.59 days 32

Figure 23. SWIFT/486 CPU time calculated for simulations with NX = 40 and NY = 19 32

List of Tables

Table 1. Development of SWIFT/486 2

Table 2. Numerical Criteria for Brine, Heat, and Radionuclide Transport 7

Table 3. Available Input/Output File Options 8

Table 4. Summary of Test Scenarios 10

Table 5. Input Parameters for Example Problem 1 (Theis Problem) 11

Table 6. Input Parameters for Example Problem 2 (Hantush Problem) 14

Table 7. Input Parameters for Example Problem 3 (Batu Problem) 16

Table 8. Input Parameters for Example Problem 4 (Beljin Radial Problem) 19

Table 9. Input Parameters for Example Problem 5 (Beljin Cartesian Problem) 23

Table 10. Input Parameters for Example Problem 6 27

Table 11. SWIFT Model Applications 34

Preface

This report describes the evaluation of a groundwater model as part of the U.S. Army Engineer Waterways Experiment Station (WES) groundwater model evaluation project. The primary objective of this work was to evaluate SWIFT/486 for efficiency of coding, convenience of input/output parameters, program portability, and sufficiency of diagnostic messages. The project was performed as a component of the WES Groundwater Modeling Program and was funded by the U.S. Army Environmental Center (AEC). Mr. Ira May was the AEC Technical Monitor for the project.

The study was conducted under the direct supervision of Dr. Mark S. Dortch, Chief, Water Quality Contaminant Modeling Branch (WQCMB), and under the general supervision of Mr. Donald L. Robey, Chief, Environmental Processes and Effects Division (EPED), and Dr. John W. Keeley, Director, Environmental Laboratory (EL). This report was written by Dr. Mansour Zakikhani, WQCMB.

Acknowledgment is made to Mr. Chris McGrath, EL, and Dr. Fred Tracy, Information Technology Laboratory, for their review and valuable suggestions.

The work was coordinated by Dr. Jeffery P. Holland, Director, Computational Hydraulic Institute, Hydraulics Laboratory, and WES Groundwater Modeling Program Manager.

At the time of publication of this report, Dr. Robert W. Whalin was Director of WES. COL Bruce K. Howard, EN, was Commander.

This report should be cited as follows:

> Zakikhani, M. (1995). "Evaluation of SWIFT/486 model with analytical solutions," Technical Report EL-95-17, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

1 Introduction

Purpose

SWIFT/486 (Sandia Waste-Isolation Flow and Transport) is a three-dimensional, finite-difference code which can be used to simulate steady-state or transient flow and transport of chemicals (including brine and radionuclide) and heat in porous or fractured geologic media. The geologic media may be homogeneous, isotropic, heterogeneous, and/or anisotropic. The transport processes which may be modeled by SWIFT/486 include advection, dispersion, sorption, decay, and leaching. The equations for fluid flow, heat transport, and brine transport are coupled by the pore fluid velocity, fluid density, fluid viscosity, and porosity. Flow and mass transport in fractured media are modeled using the dual-porosity approach (fracture-matrix). It is assumed that the transport processes in rock-matrix are one dimensional in a lateral direction relative to that in the fracture (Bear and Braester 1972, Pruesses and Narasimhan 1982). Salt dissolution and waste leaching algorithms are other optional features included in SWIFT/486. The purpose of the waste leach model is to determine the source rate at which a radionuclide from a repository is dissolved into a solution. The salt dissolution formulation is described in detail by Nolen et al. (1974). Fluid flow of variable densities and/or viscosities also may be modeled by SWIFT/486. Either a radial or Cartesian coordinate system can be used for domain discretization. The present version of SWIFT/486 is classified as a single phase and saturated flow model. More detailed information on the code capabilities is presented by Reeves et al. (1986a).

The SWIFT/486 program is an enhanced version of its predecessor codes, SWIP, SWIPR, SWIFT, SWIFT II, and SWIFT III. The codes SWIPR, SWIFT, and SWIFT II are available from the National Technical Information Service and the Energy Science and Technology Center. SWIFT III and SWIFT/486 are available from GeoTrans, Inc., Sterling, Virginia. Table 1 provides a summary of available references on each of the above versions of SWIFT.

The PC version, SWIFT/486, has been developed for the Intel 80386 and Intel 80486 CPU processors using the FTN77/486 compiler developed by the University of Salford. An optional post processing program, UNSWIFT,

Table 1
Development of SWIFT/486

Code	Code Developer	Source of Funding	Reference
SWIP	Intercomp, Inc.	U.S. Geological Survey (USGS)	Intercomp (1976)
SWIPR	Intera, Inc.	USGS	Intera (1979)
SWIFT	Intera, Inc.	National Reserch Council (NRC)	Dillon et al. (1978), Reeves and Cranwell (1981), Finley (1981), Ward et al. (1984)
SWIFT II	GeoTrans, Inc.	NRC	Reeves et al. (1986a), Reeves et al. (1986b), Reeves et al. (1986c)
SWIFT III	GeoTrans, Inc.	GeoTrans	Ward (1987)
SWIFT/386	GeoTrans, Inc.	GeoTrans	Ward (1991)
SWIFT/486	GeoTrans, Inc.	GeoTrans	Ward, Harrover, and Vincent (1993)

Source: GeoTrans (1993).

provides an interface to the contouring program SURFER (Golden Software, 1993). UNSWIFT can read pressure, temperature, brine, or nuclide concentration data from a SWIFT/486 output file (with suffix .MAP) and prepare a grid file compatible with SURFER. For this evaluation, UNSWIFT was not tested.

Scope of Report

This report describes the evaluation of SWIFT/486 by comparing computed results with six selected analytical solutions for several flow and solute transport scenarios of varying boundary conditions and solute sources in porous media. The analytical solutions were selected from those so-called classic problems such as Theis (1935) and Hantush (1960) radial problems and from the latest published solutions such as those by Batu (1984) and Beljin (1993). Some of the solutions were also given in the SWIFT/486 documents. The input parameters were selected from the SWIFT/486 reports and other published documents. The analytical solutions used are useful tools to test and initially verify the accuracy of SWIFT/486 algorithms according to certain assumptions. The analytical solutions normally are exact within a limited range of parameters. These solutions are easy to apply and require fewer input parameters. Although analytical solutions have limited applications for real field problems, they have been used extensively to check the correctness of numerical codes. The selected analytical solutions, data input, and SWIFT/486 results are described herein.

2 Model Description

Aquifer Submodels

Although SWIFT/486 is not classified as a multiphase flow and transport code, many of the variables in the SWIFT/486 code and terminology used in the documentation are derived from petroleum reservoir engineering. Hydrogeologists unfamiliar with such terminology are referred to Aziz and Settari (1979) for further information. Some of the important terms used in SWIFT/486 are briefly described below. Petroleum reservoirs are usually bounded partly or completely by the water saturated zone (aquifer). In SWIFT/486, the simulation region is divided into two subregions, an inner region (reservoir) and an outer region (aquifer). The term "reservoir" is applied to that portion of the system for which detailed information is needed. The term "aquifer" is used for the remaining portion of the system. However, hydrogeologists consider both the inner region and outer region as aquifer (saturated zone of water). In SWIFT/486, the aquifer submodel provides boundary conditions for the reservoir. A diagram showing the relationship between aquifer and reservoir for a cylindrical geometry is shown in Figure 1 (Reeves et al. 1986a). The inner dimension r_q is the external radius of the reservoir. The outer dimension r_e is the external radius chosen for the aquifer, where r_e can have a finite or infinite value. The default value for r_e in SWIFT/486 is infinity. The aquifer (outer region) thickness Δh is input into SWIFT/486 through a permeability-thickness product (average value of transmissibility) and a porosity-thickness product defined in the input file. Three different aquifer (boundary conditions) submodels are provided in the SWIFT/486 program: an unsteady-state aquifer, a steady-state aquifer, and a pot (no-flow condition) aquifer. In each, a type-three condition (e.g., Cauchy boundary condition) is provided for each boundary grid block. The rate of flow from aquifer to reservoir varies with the pressure change within the block.

Aquifer-influence function and boundary conditions

Aquifer-influence functions are analytic submodels used for treating both external and internal boundaries. SWIFT/486 has three submodels which are coupled to the reservoir implicitly under the influence functions. The aquifer-influence functions are designed to save computational time by simplifying

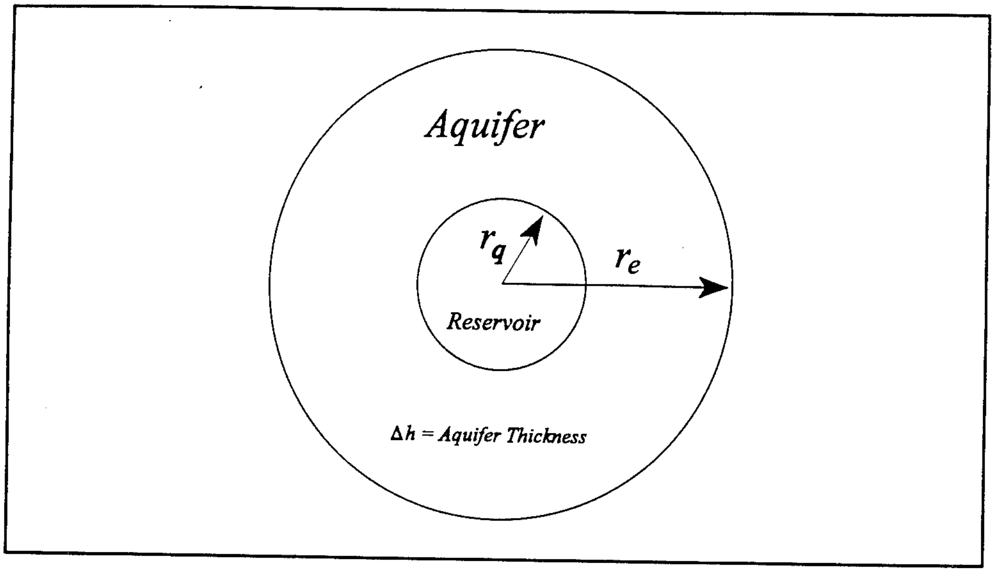


Figure 1. Geometric parameters of the reservoir and aquifer in cylindrical geometry (after Reeves et al. 1986a)

simulation in the peripheral domain regions where the detailed information is not needed. Aquifer-influence functions can be used to specify boundary conditions for pressure, temperature, and chemical concentration. The default flow boundary condition is no flow across the aquifer-reservoir boundaries.

Initial conditions

SWIFT/486 assumes initially that flow in a hydrologic system is in hydrostatic equilibrium. The user must provide an initial fluid pressure at any chosen reference point needed to calculate hydrostatic pressures for other points in the domain (Reeves et al. 1986a). Constant flux of flow can also be specified. The initial condition for temperature is specified using an interpolation function (Reeves et al. 1986a). The initial conditions for both brine and radionuclide concentration may be input directly by the user.

Well submodel

A source or sink can be specified in SWIFT/486 using the well option defined in the code. The wells also may be used to simulate both a nonpoint aquifer recharge from upland areas and an aquifer discharge into rivers or streams. This model option can be used to switch from flow rate to pressure control. Well option is also used to specify injection (recharge) or pumping (discharge) sources of fluid, heat, brine, or radionuclide.

SWIFT/486 has a special numerical treatment for fluid production/ injection wells. This technique has been used in petroleum reservoir engineering. For each well, three parameters are defined: well index, mobility, and

rate allocation. The well index characterizes the transmitting capability of the well surrounding a region (skin). The well index may be estimated by a one-dimensional, steady-state flow solution which is a function of the hydraulic conductivity of well surroundings. The horizontal length of skin may be chosen as the size of the block (grid cell). In this case the well index is related to the transmissibility. The mobility parameter is similar to the well index except it is a function of thickness of aquifer layers. A fractional allocation factor is assigned to each layer. Each factor is assumed to be proportional to the thickness-permeability product for that layer. The rate allocation parameter assigns the way that the flow partitioning can take place within the layers. The rate allocation can be on the basis of mobilities (flow rates) or mobilities and pressure drops. These parameters are described in detail by Reeves et al. (1986a,b, and c).

Global, Local, and Primary Equations

SWIFT/486 may be used to simulate flow and mass transport in both porous and/or fractured media. Two separate sets of equations are used: one for porous or fractured zones and a second set to describe flow and transport in matrix blocks of a fractured zone. The equations which are used for porous media or fractured zone are called "global" equations. The equations which describe flow and mass transport in the matrix part of a fractured zone are called "local" equations. The term "global" or the term "local" is used in SWIFT/486 for the parameters calculated by the related equations. In SWIFT/486, primary equations refer to equations for flow, heat, and brine transports because density, viscosity, porosity, and enthalpy are functions of pressure, temperature, and brine concentration. Two steady-state solutions options are provided for the global flow and brine transport equations. Heat transport and radionuclide transport are not included in the steady-state option. The code will permit a steady-state solution of the primary equations (flow or brine) with the transient solution of radionuclide or heat transport.

Mass Balance Calculation

SWIFT/486 calculates local and global mass balances for flow and solute transport including heat, brine, unleached radionuclide, leached but not dissolved radionuclide (enhanced transport), dissolved radionuclide and radionuclide in the matrix subsystem. The control parameter for mass balance output is named LMBAL on record M-2 in the input file. In addition, the model user can control the mass balance output for both the global system and the local subsystems by specifying the parameter, I01, in the R2-13 block of the input file. Mass balance at any time of a simulation also can be written into a file assigned for Unit 17.

Numerical Considerations

The numerical results of SWIFT/486 mass transport simulations are usually a function of two dimensionless numbers, Peclet number and Courant number. The calculated values of these two numbers will appear on the screen during a simulation and in the main output file. Because of the significance of Peclet and Courant numbers and their effects on the SWIFT/486 simulation results, these numbers are defined here. The Peclet number is the ratio of advective to dispersive transport, and in the x-direction is given as follows:

$$P_e = \frac{V_x \, \Delta x}{D_{xx}} = \frac{V_x \, \Delta x}{\alpha \, V_x} = \frac{\Delta x}{\alpha} \tag{1}$$

where

V_x = velocity in x-direction $[LT^{-1}]$

α = longitudinal dispersivity $[L]$

Δx = grid spacing in x-direction $[L]$

D_{xx} = dispersion coefficient in x-direction $[L^2T^{-1}]$

The Courant number is the ratio of a distance travelled by constituent (e.g, contaminat, solute, etc.) within a time step Δt to the grid dimension in a flow direction. For flow in the x-direction, the courant number Co_x is defined as follows:

$$Co_x = \frac{V_x \, \Delta t}{\Delta x} \tag{2}$$

The Peclet number and Courant number are functions of grid spacing, time step, and flow velocity. In SWIFT/486, the block-size and time-step restrictions are not overly severe for many problems (Reeves et al. 1986a). In some cases, the convection terms (velocity terms) in the transport equations may cause some numerical errors. These errors are introduced into the solution as numerical dispersion and the overshoot-undershoot phenomena. To reduce these numerical errors, the convection terms in transport equations usually are modified. Several techniques have been developed to overcome these problems. Among these are the method of characteristics (Garder et al. 1964, Bredehoeft and Pinder 1973), a higher order Galerkin method (Price et al. 1968, Pinder 1973], various upstream-weighting and asymmetric-weighting strategies (Nolen and Berry 1972, Christie et al. 1976), and the distributed-velocity method (Campbell et al. 1981).

The SWIFT/486 code has several options for treating numerical dispersion and/or overshoot-undershoot problems. In Table 2, v is a generalized Darcy flow velocity; Δx, Δy, and Δt are grid spacing in x-direction, y-direction, and time, respectively; α_L is the longitudinal dispersivity; u is the Darcy velocity; D_m is molecular diffusion coefficient; ϕ is the porosity; ρ_R is the formation density; k_d is the adsorption coefficient; K_m is the heat conductivity parameter; c_p is the specific heat of the fluid; c_{PR} is the specific heat of the rock (formation); and c_w is the compressibility of fluid.

Table 2
Numerical Criteria for Brine, Heat, and Radionuclide Transport (Reeves et al. 1986a)

Scheme[1]	Numerical Dispersion	Dispersion Criterion	Overshoot Criteria
CIT-CIS	None	None	$v\Delta t/\Delta x + 2D\Delta t/\Delta x^2 \leq 2$ $v\Delta x/2 \leq D$
CIT-BIS	$v\Delta x/2$	$v\Delta x/2 << D$	$v\Delta t/\Delta x + 2D\Delta t/\Delta x^2 \leq 2$
BIT-CIS	$v^2\Delta t/2$	$v^2\Delta t/2 < D$	$v\Delta x/2 \leq D$
BIT-BIS	$v\Delta x/2 + v^2\Delta t/2$	$v\Delta x/2 + v^2\Delta t/2 < D$	None

$D = (\alpha_L u + D_m)/(K\phi)$; $K = 1 + (1-\phi)\rho_R k_d/\phi$, radionuclide or brine transport
$D = (\alpha_L u \rho c_p + K_m)/(K\phi\rho c_p)$; $K = 1 + (1-\phi)\rho_R c_{pR}/(\phi\rho c_w)$, heat transport
[1] CIT = centered in time; BIT = backward in time; CIS = central in space; BIS = backward in space.

Input File

Two important elements of an input file in SWIFT/486 consist of data on geometric gridding and on numerical criteria parameters. In regard to geometric gridding, both three-dimensional Cartesian (x,y,z) and axially symmetric coordinates (r,z) can be modeled by SWIFT/486. Discretization in a Cartesian system is done through direct input of the increments. The user may generate a mesh system by specifying all values of increment in the x-, y-, and z-direction (DX, DY, and DZ) in the input file. For the radial (r,z) coordinate, the mesh may be generated automatically by assigning a few parameters; alternatively, all mesh data may be defined explicitly by the user.

The discrete geometry, in either the Cartesian coordinate system or cylindrical coordinate system, is called a global in order to distinguish it from local discretization. For fractured zone discretization, some grid blocks may be defined as dual-porosity or doubly porous media. For such blocks, a local mesh is automatically generated. The numerical criteria are controlled by parameters assigned in the input file by the user. These criteria control numerical dispersion, overshot-undershot errors, adjustment of decay constants, etc. Detail on forming an input file is given in Ward et al. (1993).

Output File

The main output file created by running SWIFT/486 has the suffix .OUT. Other auxiliary files (Table 3) may also be generated for other purposes by assigning several output control parameters in the input file. Table 3 shows a list of available output files in SWIFT/486. The main output file and its unit number are shaded in Table 3. For more detail, the reader is referred to SWIFT/486 user's manual (Ward et al. 1993).

Table 3
Available Input/Output File Options

Unit	Function	Default File Suffix
4	Input for restart calculation	.RST
7	Output for streamline postprocessing	.VL
8	Output for subsequent restart calculation	.WR
9	Output for nuclide monitor post processing	.NM
10	Output for contouring based on mapping options	.XYZ
11	Input for heterogeneous reservoir R1-21	.BIN
12	Input and output for plotting via SWIFT	.WL
13	Output for contour mapping using MODFLOW format (UNSWIFT program reads this file)	.MAP
15	Standard 80 column input	.DAT
16	Standard 132 column output for printer	.OUT
17	Output for mass balance summary	.MBL
18	Output for an aquifer influence function flux values	.AIF

3 Model Performance

A numerical code such as SWIFT/486 may be evaluated for efficiency of coding by checking its speed of running (CPU time) for specific computer type and simulating problems, optimal use of computer storage, convenience of input/output, program portability, and diagnostic messages. In this investigation, SWIFT/486 was evaluated for all the above evaluation steps except optimal use of computer storage. The numerical accuracy of SWIFT/486 was evaluated by a comparison of simulation results with analytical solutions. The selected analytical problems include a variety of initial and boundary conditions. The model was reviewed for efficiency of coding by checking its speed of run, convenience of input/output by checking data input and output information, program portability by using it in two different computer systems (DOS and UNIX), and available diagnostic messages by observing those received during the simulations. Although emphasis in this report is given to model performance against the analytical solutions, the concluding remarks on all of the above evaluation steps are provided for the reader.

Platform for Evaluation

SWIFT/486-Version 2.53 has been designed for a PC, specifically the 80386 and 80486 processors, offering a run-time monitor to facilitate the progress and status of batch processing. It requires the FTN77/486 (FTN77/x86) Fortran compiler, version 2.6 and higher. The simulations described here were performed on a 486 PC running at 66 MHz using DOS with the FTN77/x86 Fortran compiler. The use of this specific compiler does not mean an endorsement by the U.S. Army Engineer Waterways Experiment Station (USAEWES) nor by any other branch of the U.S. Government.

Modifications for the Evaluation

SWIFT/486 reads input parameters from a formatted file. For large data input, this could be a cumbersome task. To provide an easy way to enter data in the input file, the READ statements in the SWIFT/486 source files were modified to read unformatted parameters. The source programs then were complied and linked using FTN/x86 supported by Salford Software (1993).

Example Problems

In this section the applications of SWIFT/486 to six problems for several flow and mass transport scenarios are discussed. To check the accuracy of SWIFT/486 algorithms within a limited range of available data, the simulated results are compared with the analytical solutions for simplified groundwater problems. Table 4 shows a summary of test scenarios.

Table 4
Summary of Test Scenarios

Problem Number	Description	Coordinate System	Reference
1	Fully penetrating well	Radial	Theis (1935)
2	Fully penetrating well in a leaky aquifer	Radial	Hantush (1960, 1961)
3	Steady-state horizontal flow in a heterogeneous aquifer	Cartesian	Batu (1984)
4	Transport in a plane flow	Radial	Beljin (1991, 1993)
5	Transport from a continuous source	Cartesian	Beljin (1991, 1993)
6	Transport of a solute slug	Cartesian	Beljin (1991,1993)

Problem 1, Fully penetrating well in a confined aquifer

Objectives. The purpose of this exercise is to test the pressure solution, aquifer-influence function, radial geometry, and the rate-controlled well parameter.

Problem statement. A fully penetrating well tapping an infinite, homogeneous, confined aquifer is pumped at a constant rate. The resulting drawdown can be calculated using an analytical solution developed by Theis (1935). The aquifer storativity S and transmissivity T are calculated using rock compressibility c_r, the water compressibility c_w, the hydraulic conductivity K, and the aquifer thickness b as:

$$\begin{aligned} S &= \rho\, g\, \phi\, (c_r + c_w)\, b \\ T &= K\, b \end{aligned} \tag{3}$$

where g is the gravitational constant (9.806 m/s) and other parameters are defined in Table 5. The water compressibility is assumed to be zero ($c_w = 0$).

Input. The specific input parameters for this problem are given in Table 5. These data are referenced by Ward et al. (1984) and Ross et al.

Table 5
Input Parameters for Example Problem 1 (Theis Problem)

Parameter	Symbol/Unit	Value
Storativity	S (dimensionless)	0.001
Transmissivity	T (m^2/s)	0.001
Pumping rate	Q (m^3/s)	0.003
Porosity	φ (dimensionless)	0.2
Hydraulic conductivity	K (m/s)	3.28×10^{-4}
Viscosity	μ (Pa-s)	0.001
Density	ρ (kg/m^3)	999.5
Rock compressibility	c_r (1/Pa)	1.67×10^{-7}
Aquifer thickness	b (m)	3.05
Wellbore radius	r_w (m)	0.1143
Aquifer radius	r_e (m)	6096

(1982) and are used here in both SWIFT/486 simulations and the analytical solutions.

Numerical specification. The SWIFT/486 radial (cylindrical geometry) coordinate system option was used by specifying 50 elements in the radial direction and one element in the z- and y-directions. The well radius was $r_w = 0.1143$ m, and the radius of the domain was $r_e = 6096$ m. The selected domain radius satisfies the condition of infinite domain required by the analytical solution. The discretization in the radial direction was done automatically by the SWIFT/486 program. (See the input and the output for this problem in Appendix A.)

Output. Output for this example (Figures 2 and 3 and Appendix A) includes pressure, time, and distance. Because the analytical results were in terms of drawdown and not in pressure, the output from SWIFT/486 was converted into the drawdown s [L] by the following equation:

$$s = \frac{p_b - p\,(r,\,z,\,t)}{\rho\, g} \tag{4}$$

where

p_b = specified pressure value at the boundary, Pa

$p(r,z,t)$ = calculated pressure at a radial distance r, vertical distance z, and time t

ρ = water density

g = gravitational constant (9.806 m/s)

Results. Graphical comparison of numerical approximation and analytical solution are presented in Figure 2 as the drawdown versus time at a radial distance, r = 100 m, and drawdown versus distance at time, t = 100 days, respectively. There is good agreement between the numerical results and the analytical results at all distances and times.

This test shows that SWIFT/486 correctly calculates spatial and temporal pressure variations in a radial (cylindrical) coordinate system. The test also verifies that the aquifer-influence function works according to its purpose which is to provide boundary conditions for an infinite domain.

Problem 2, Fully penetrating well in a leaky aquifer with storage

Objectives. The objectives in Example Problem 2 are to test the pressure solution, the coupling of vertical flow in an aquitard with horizontal flow in an aquifer, a rate-controlled well condition, and the aquifer-influence function in a radial coordinate system.

Problem statement. A fully penetrating well in an infinite, homogeneous, and isotropic aquifer is pumped at a constant rate. The aquifer is bounded below by an impervious layer and above by a semi-impervious layer or aquitard. Initially, the water pressure is uniform in the aquifer and the aquitard. Flow is predominantly vertical in the aquitard and horizontal in the aquifer. The analytical solution for this problem, assuming homogeneous and isotropic aquifer and constant pumping rate, was given by Hantush (1960, 1961).

Input. The major input parameters used in this problem (Table 6) are described by Ross et al. (1982) and Ward et al. (1984).

Numerical specification. The SWIFT/486 radial coordinate system option (cylindrical geometry) was used by specifying 50 elements in the radial direction, one element in the y-direction, and two elements in the z-direction. The well radius is 0.1143 m and the radius of domain r_e is 6,096 m. The selected domain radius satisfies the condition of infinite domain imposed by the analytical solution. The discretization in the radial direction was done automatically by the SWIFT/486 program by assigning R1 = 0.2957 m in the R1-22 record in the input file (Appendix A).

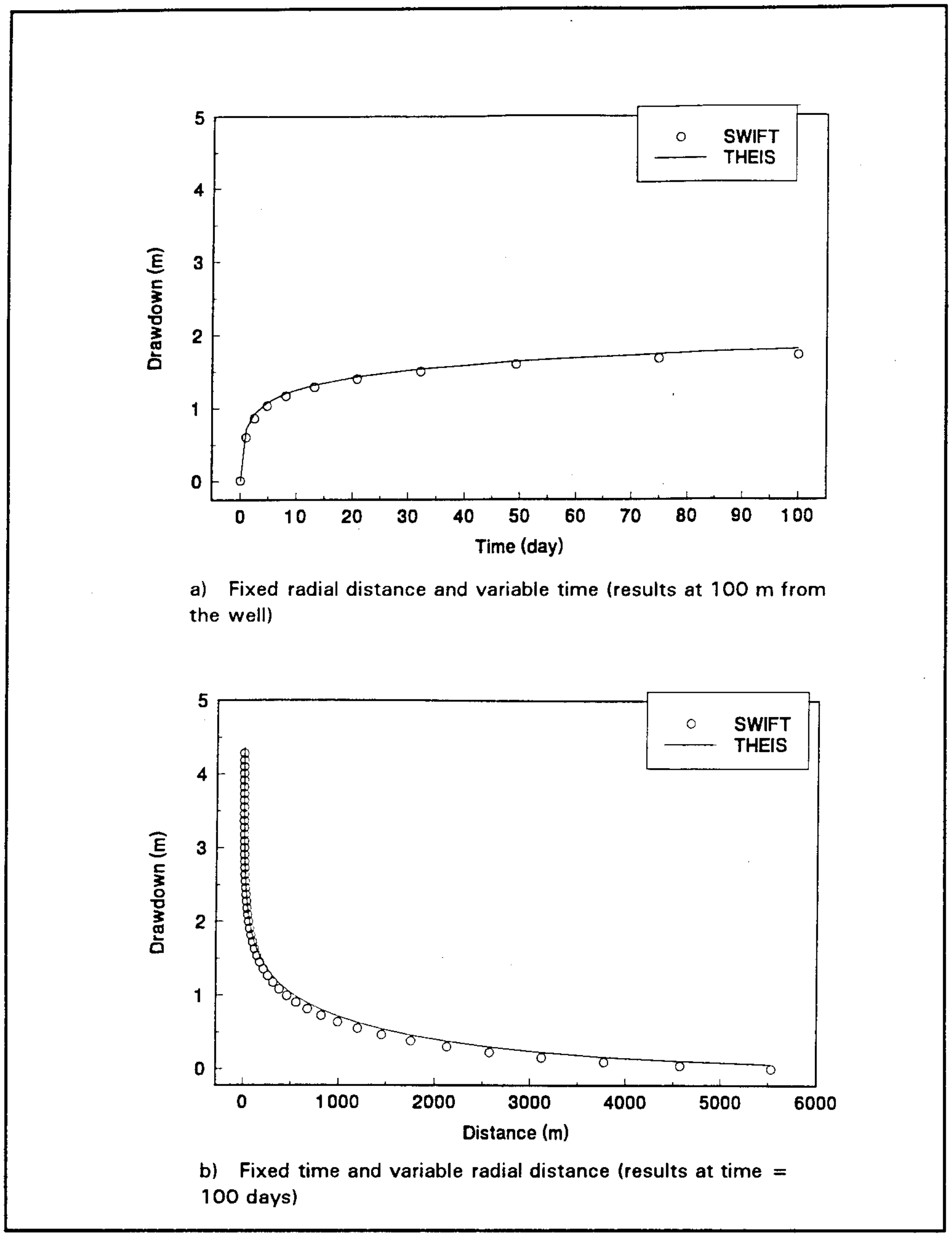


Figure 2. Comparison of SWIFT/486 simulation results with analytical solutions for Theis radial problem

Output. The SWIFT/486 output is given in Appendix A. From that output, the pressure data were converted into the drawdown and were plotted versus radial distance in Figure 3.

Results. The results of the SWIFT/486 simulation and analytical solution at a radial distance of 20 m are shown in Figure 3. A comparison between these results indicates that there is a good agreement between the numerical

Table 6
Input Parameters for Example Problem 2 (Hantush Problem)

Parameter	Symbol/Unit	Value
Aquifer storativity	S (dimensionless)	10^{-4}
Aquifer transmissivity	T (m^2/s)	10^{-3}
Aquitard specific storativity	S (dimensionless)	3.0×10^{-3}
Aquitard hydraulic conductivity	K' (m/s)	3.0×10^{-10}
Aquitard thickness	b' (m)	0.3
Pumping rate	Q (m^3/s)	0.014
Aquitard porosity	ϕ'	0.4
Aquifer porosity	ϕ	0.004
Fluid viscosity	μ (Pa-s)	0.001
Fluid density	ρ (kg/m^3)	1,000
Rock compressibility	c_R(Pa^{-1})	7.67×10^{-7}
Wellbore radius	r_w(m)	0.1143
Aquifer radius	r_e(m)	6096.0

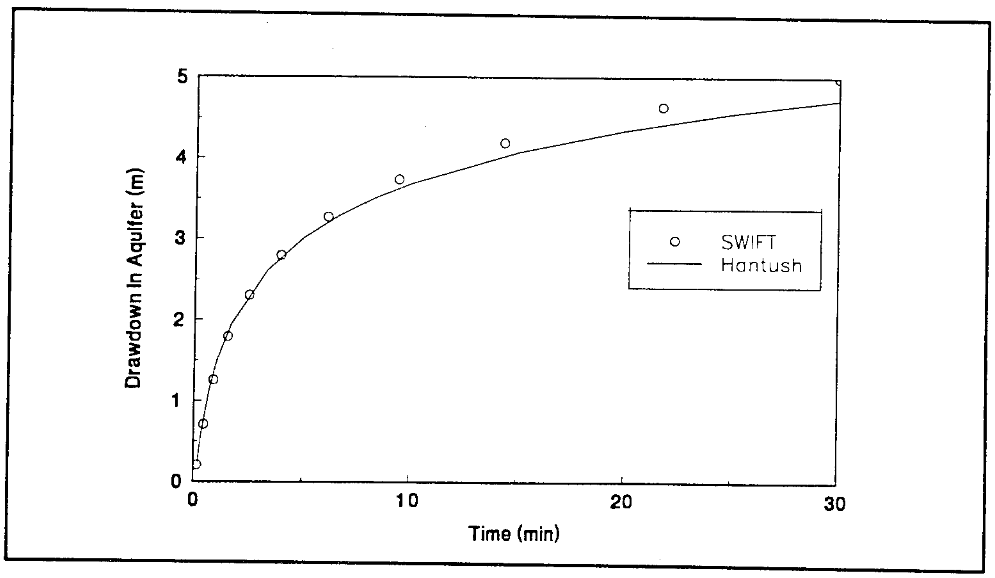


Figure 3. Results of SWIFT/486 simulation and leaky aquifer analytical solution (R = 20 m)

and analytical solutions up to about 10 min after the pumping started. The results after 10 min, however, indicate that SWIFT/486 overestimated the drawdown compared with the analytical solution. This overestimation of the results by SWIFT/486 is due to an increase of the time step as the simulation proceeded with time. Similar agreement also was reported by Ward et al. (1984).

This test verifies the accuracy of the pressure solution for a leaky aquifer with radial geometry using the rate-controlled well condition and aquifer-influence function options.

Problem 3, Steady-state horizontal flow in a heterogeneous aquifer

Objectives. The purpose of this simulation is to test the capability of SWIFT/486 for simulating flow through a simple heterogeneous porous medium in a Cartesian coordinate system.

Problem statement. A steady-state, one-dimensional, horizontal flow occurs in a confined and rectangular aquifer. The horizontal hydraulic conductivity varies continuously as an exponential function of x and z (Batu 1984). The vertical hydraulic conductivity is assumed to be zero everywhere.

The governing equation is given by:

$$\frac{\partial K_x(x,z)}{\partial x} \frac{\partial h}{\partial x} + K_x(x,z) \frac{\partial^2 h}{\partial x^2} = 0 \tag{5}$$

in which the hydraulic conductivities in x-direction K_x and z-direction K_z are defined as:

$$\begin{aligned} K_x(x,z) &= a \exp(bx + cz + d) \\ K_z(x,z) &= 0 \end{aligned} \tag{6}$$

where a $[LT^{1}]$, b $[L^{-1}]$, c $[L^{-1}]$, and d $[L^{0}]$, are arbitrary constants.

The solution for Equation 5 (Batu 1984) for a simulated domain of horizontal length dimension L and constant boundary heads at the upstream h_1 and the downstream h_2 is:

$$\begin{aligned} h(x) = {} & [\exp(-bL) - 1]^{-1} [h_1 \exp(-bL) \\ & - h_2 + (h_2 - h_1) \exp(-bx)] \end{aligned} \tag{7}$$

Using the Darcy flow equation, the seepage velocity component in the x-direction is given as:

$$u = \frac{1}{\phi} ab [1 - exp(-bL)]^{-1}(h_1 - h_2) exp(cz + d) \quad (8)$$

where ϕ is the porosity.

Input. The input parameters for this problem were taken from Batu (1984) and are listed in Table 7.

Table 7
Input Parameters for Example Problem 3 (Batu Problem)

Parameter	Value
a	0.006 m/s
b	0.05 m^{-1}
c	0.20 m^{-1}
d	-2
Porosity, n	0.4
Horizontal length, L	20 m
Upstream piezometric head, h_1	11 m
Downstream piezometric head, h_2	6 m

Numerical specification. The domain for this problem has a dimension of 20 m in the x-direction, 0.5 m in the y-direction, and 0.5 m in the z-direction. A total of 40 elements in the x-direction, 1 element in the y-direction, and 10 elements in the z-direction were used for this application. The boundary conditions consist of fixed total hydraulic heads at x = 0 and x = 20 m, and zero fluxes at the upper and lower parts of the domain (Figure 4). The hydraulic conductivity varies in the x- and z-direction; a contour plot of the hydraulic conductivity is given in Figure 5.

Output. Output for Example Problem 3 is given in Appendix A. Seepage velocity and hydraulic conductivity data are plotted in Figure 6.

Results. As shown in Figure 6, the numerical results are almost identical to the analytical solution results. This test showed that SWIFT/486 is capable of solving a simplified heterogeneous porous media problem.

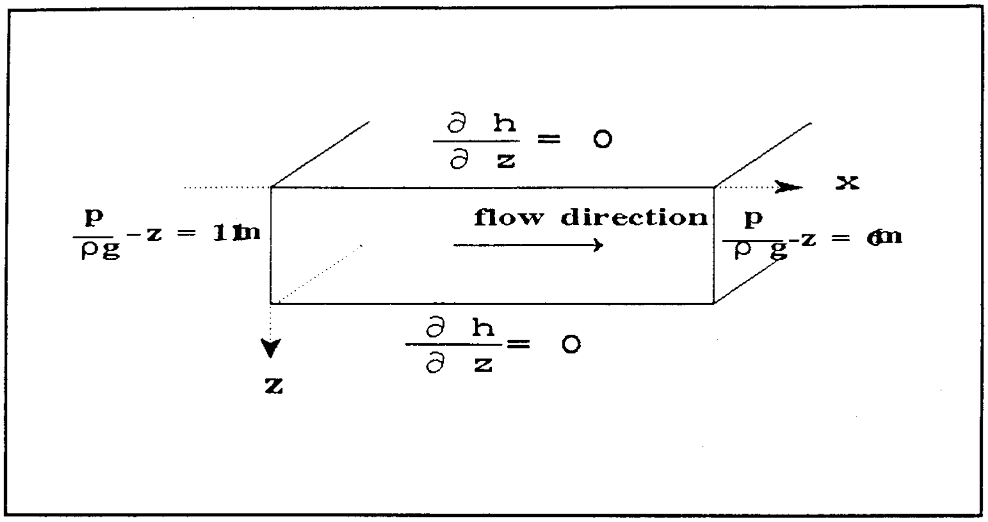


Figure 4. Schematic of domain with boundary conditions specified along the domain

Problem 4, Transport in a plane radial flow field

Objectives. The main objective in Example Problem 4 is to evaluate the brine transport option of SWIFT/486 by applying it to solute transport of a chemical with constant water density. Other objectives are to check the ability of SWIFT/486 to calculate the velocity field around an injection well, to simulate solute transport in radial flow, and to use the aquifer influence function.

Problem statement. This problem describes the dispersion of a conservative solute injected via a fully penetrating well in a confined, homogeneous and isotropic aquifer. The main assumptions are that (a) the injection rate of fluid is constant, (b) the regional groundwater velocity is negligible compared with the velocity created by injection, and (c) steady-state flow occurs. Note that for steady-state plane radial flow, the product of velocity times radial distance Vr remains constant.

The governing advective-dispersive equation is given as (Hoopes and Harleman 1967):

$$\frac{1}{r}\frac{\partial}{\partial r}\left(Dr\frac{\partial C}{\partial r}\right) - \bar{V}\frac{\partial C}{\partial r} = \frac{\partial C}{\partial t} \tag{9}$$

where

r = radial distance [L]

D = dispersion coefficient [L^2 T^{-1}]

C = concentration [M L^{-3}]

V = average flow velocity [L T^{-1}]

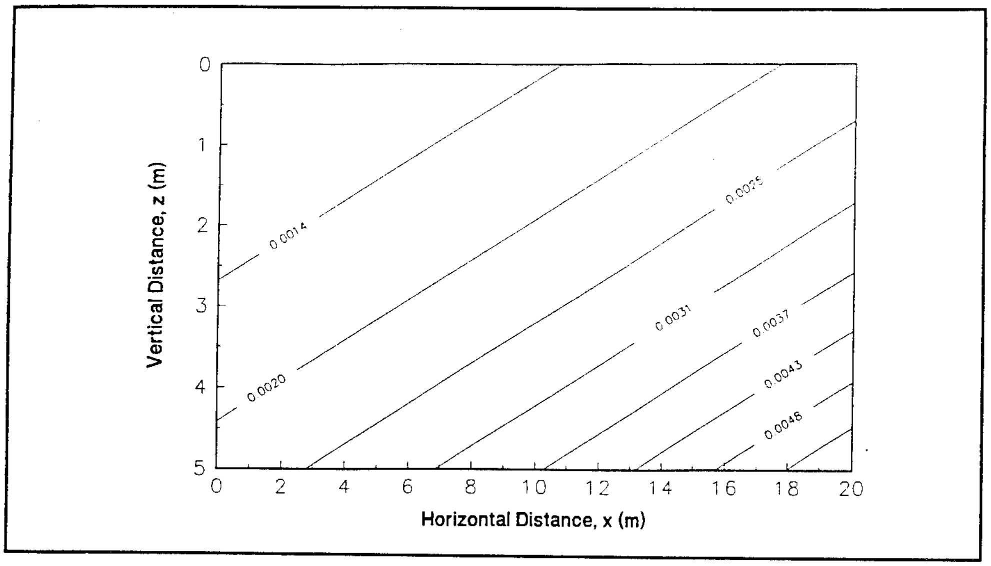


Figure 5. Contours of hydraulic conductivity as function of x and z (m/s)

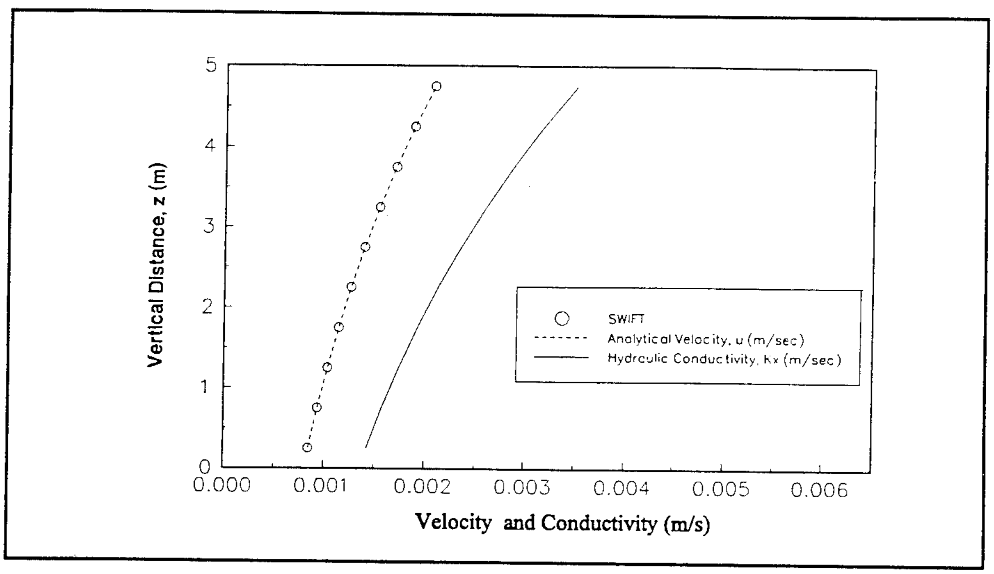


Figure 6. Simulated SWIFT results and analytical solutions for inhomogeneous domain (Batu 1984)

Input. The main input parameters and analytical solution for this problem are from Beljin (1991, 1993). A summary of data used in SWIFT/486 and the analytical solution included in SOLUTE software package by Beljin (1993) is given in Table 8.

Numerical specification. A cylindrical domain with 100 elements in the radial direction and 1 element in the z-direction was specified for this problem. The radial distance was 50 m, and the total depth was 3.048 m. The radius of the well was 0.1143 m. The brine transport option of SWIFT/486

Table 8 Input Parameters for Example Problem 4 (Beljin Radial Problem)	
Parameter	**Value**
Well recharge rate *Q*	25.0 m^3/d (4.59 gpm)
Thickness of aquifer, *b*	3.048 m (10.0 ft)
Porosity, *n*	0.25
Lateral dispersivity, α_T	The same as longitudinal
Longitudinal dispersivity, α_L	0.300 m (0.984 ft)
	0.150 m (0.492 ft)
	0.015 m (0.049 ft)
Time, *t*	20.0 d

was used to simulate a conservative solute transport for three dispersion coefficients.

Output. Output for Example Problem 4 is included in Appendix A. The graphic representations of scaled or normalized (dimensionless) concentration versus the radial distances at a time of 20 days for different dispersion coefficients are plotted in Figures 7-9.

Results. SWIFT/486 was simulated for three different dispersivity coefficients of 0.3 m, 0.15 m, and 0.015 m. As shown in Figures 7 and 8, there is a good agreement between the simulated results and analytical solutions for the two former dispersivities. For dispersivity of 0.015 m (higher Peclet number), the simulated results deviated slightly from the analytical solution at certain locations (Figure 9).

For radial problems, SWIFT/486 incorrectly calculates the Peclet number.[1] Therefore, for the radial problems, the user can ignore a warning sign of a high Peclet number that may appear on screen or in the output file. In other words, for a radial problem, even if the Peclet number is in the acceptable range, the computer program will still warn the user of a high Peclet number.

This test verified that the "brine" transport options of SWIFT/486 worked correctly to solve well injection of a dissolved chemical for a simple problem.

[1] Personal Communication, (1994). D. Ward, Vice President, GeoTrans, Inc., Sterling, VA 20166.

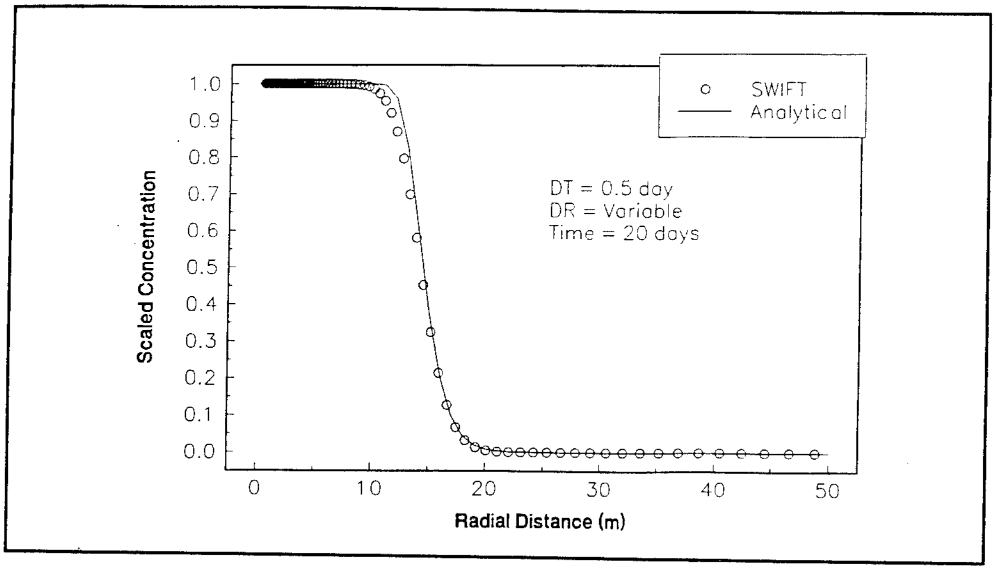


Figure 7. Simulated SWIFT/486 results and analytical solutions for a radial solute transport problem with dispersivity coefficient of 0.3 m

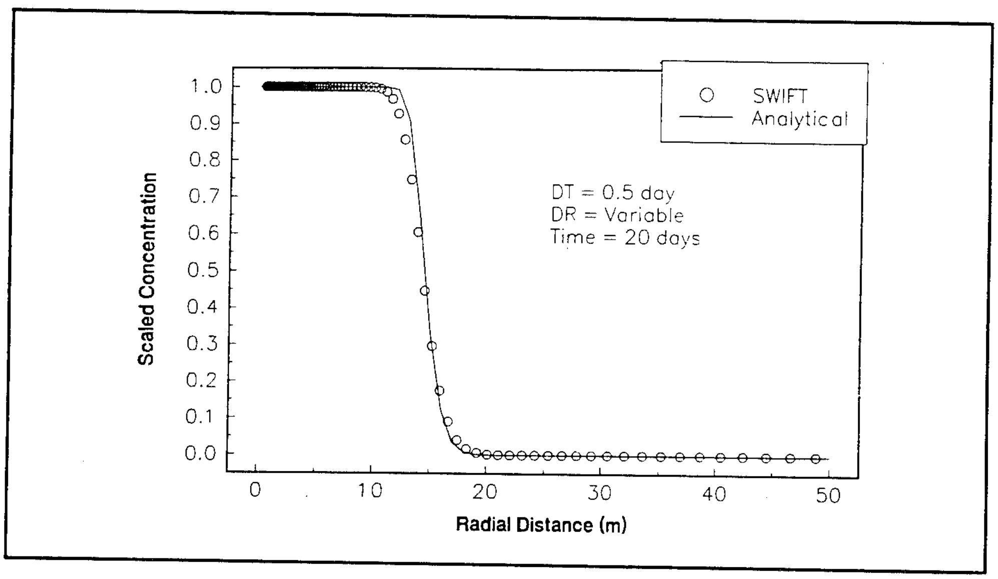


Figure 8. Simulated SWIFT/486 results and analytical solutions for a radial solute transport problem with dispersivity coefficient of 0.15 m

Problem 5, Transport from a continuous point source in a uniform two-dimensional flow field

Objectives. The purpose of Example Problem 5 is to evaluate SWIFT/486 for transport options solving a continuous source in a Cartesian coordinate system and to check decay and adsorption/desorption options.

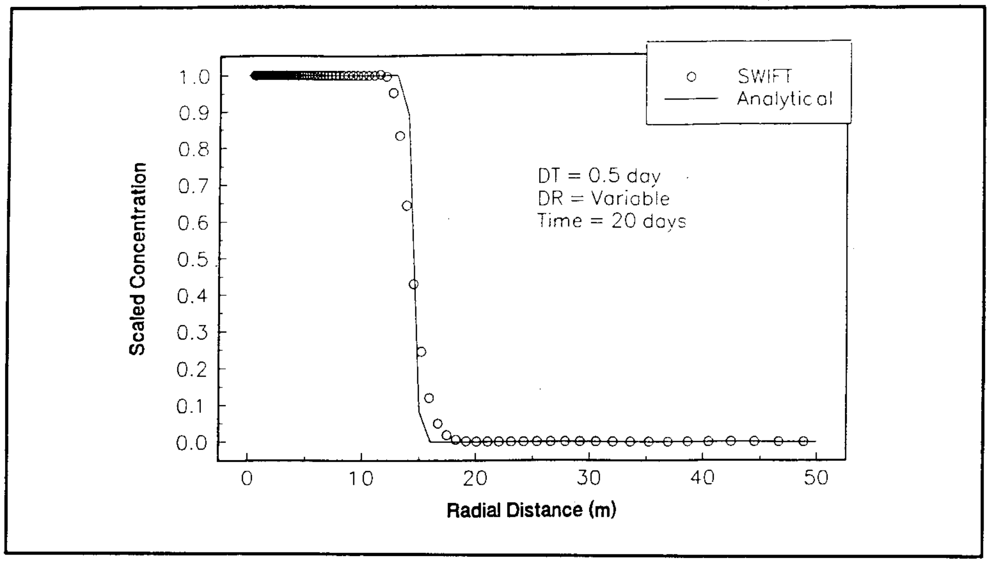


Figure 9. Simulated SWIFT results and analytical solutions for a radial solute transport problem with dispersivity coefficient of 0.015 m

Problem statement. In this problem, a conservative tracer is injected into an aquifer via a fully penetrating well (Beljin 1991, 1993). A plume develops from the source and spreads out to the sides of the aquifer. If one assumes uniform mixing of mass throughout the aquifer thickness, two-dimensional (x-y plane) tracer solute transport can be described as follows:

$$D_{xx} \frac{\partial^2 C}{\partial x^2} + D_{yy} \frac{\partial^2 C}{\partial y^2} - \bar{V} \frac{\partial C}{\partial x} - \lambda RC + \frac{Q_c}{\phi} = R \frac{\partial C}{\partial t} \tag{10}$$

$$\begin{aligned} C\,(x,y,0) &= 0 \\ Q_c(x,y,t) &= Q\, C_0\, \delta(x,y) \\ C\,(\pm\infty, \pm\infty, t\,) &= 0 \end{aligned} \tag{11}$$

where λ is a first-order decay constant [1/T]; R is the retardation coefficient [dimensionless]; Q_c is the mass injection rate of solute per unit volume of aquifer [M T^{-1} L^{-3}]; Q is the volumetric injection rate of fluid per unit of aquifer thickness [L^2 T^{-1}]; C_0 is the concentration of the injected fluid [M L^{-3}]; and $\delta(x,y)$ is the Dirac delta function [$1/L^2$]. In SWIFT/486, the retardation coefficient is calculated using the formation density ρ_R (BWRN), the adsorption coefficient K_d (DIS), and the formation porosity ϕ (POROS) as:

$$R = 1 + \frac{(1 - \phi)}{\phi} \rho_R K_d \tag{12}$$

Note that BWRN, DIS, POROS are variable names used in SWIFT/486 for formation density, adsorption coefficient, and porosity, respectively. For retardation factor of $R = 2$, the adsorption coefficient K_d was calculated to be:

$$K_d = 1 + \frac{1 - 0.35}{0.35} \times 1690 = 3.263 \times 10^{-4} \tag{13}$$

SWIFT/486 calculates the concentration in mass fraction (normalized). To convert mass fraction to other concentration units, for example to milligrams per liter, mg/ℓ, the following relationship can be used:

$$\frac{mg}{\ell} = \textit{mass fraction} \times \textit{fluid density}\ (kg/m^3) \times 1{,}000 \tag{14}$$

where 1,000 is a conversion factor.

Input. The input parameters used in this example are from a measurement at a field site located in Long Island, New York (Pinder 1973, Wilson and Miller 1978, Beljin 1988). The original data were measured for a plume of hexavalent chromium. However, for this example, it was assumed that the chemical did not change chemically; therefore, the type of chemical is immaterial. The major input data are given in Table 9. Note that flow velocity was input directly into the analytical solution while for the numerical solution it was calculated using the hydraulic conductivity and gradient.

Numerical specification. A Cartesian coordinate system with 32 elements in the x-direction, 5 elements in the y-direction, and 1 element in the z-direction was used. Spacing in the x-direction (DX) was set to 60 m, in the y-direction (DY) was set to 30 m, 50 m, and 60 m, respectively, for the three different simulations, and in the z-direction (DZ) was set to 33.5 m (depth of aquifer). The radioactive transport option of SWIFT/486 was used to simulate a nonradioactive chemical with and without adsorption in effect.

Output. The output for Example Problem 5 is included in Appendix A. Concentration versus the distance profiles are given in Figures 10-15.

Results. The results of six different scenarios are shown in Figures 10-15. In Figures 10, 11, and 12, all the input parameters including Δx and Δz were fixed, but Δy was changed to 30, 50, and 60 m. As shown in Figures 10, 11, and 12, the variation of the grid spacing in the y-direction had little effect on the results. In another scenario, the retardation coefficient was changed from $R = 1$ to $R = 2$ (Figures 12 and 15), and as expected, the solute transport delayed. For retardation coefficient of $R = 1$ (no adsorption), $\Delta x = 60$ m, $\Delta y = 60$ m, and $\Delta t = 100$ days, the simulation results at the times of 1,000 days, 2,000 days, and 2,800 days (Figures 12, 13, and 14) showed a

Table 9
Input Parameter for Example Problem 5 (Beljin Cartesian Problem)

Parameter	Value
Darcy velocity, v	0.161 m/d (0.525 ft/d)
Seepage velocity, $\bar{V}$	0.460 m/d (1.500 ft/d)
Porosity, n	0.35
Longitudinal dispersivity, α_L	21.3 m (69.9 ft)
Transverse dispersivity, α_T	4.27 m (14.0 ft)
Aquifer saturated thickness, b	33.5 m (110 ft)
Point source strength, Q	23.59 kg/d (52 lb/d)
$Q\,C_0$	704.0 g/(m d)
Time, t	1000, 2000, and 2800 d
Case 1, retardation factor, R	1.0
Decay constant , λ	0.0 1/d
Case 2, retardation factor, R	2.0
Decay constant, λ	0.00019 1/d

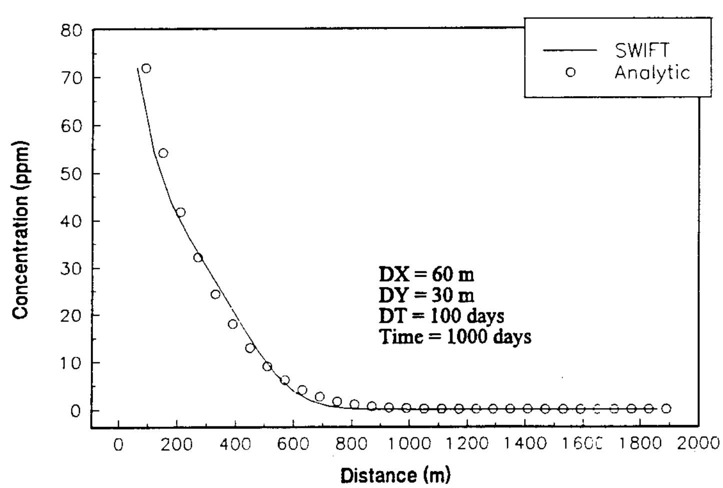


Figure 10. Simulated SWIFT results and analytical solutions for two-dimensional continuous source problem with DY = 30 m and retardation coefficient R = 1

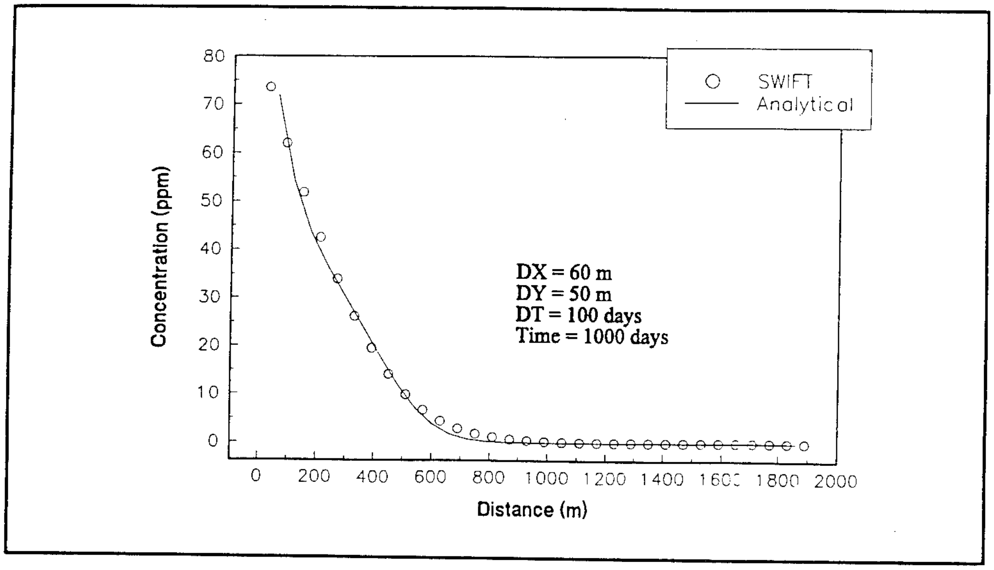


Figure 11. Simulated SWIFT results and analytical solutions for two-dimensional continuous source problem with DY = 50 m and retardation coefficient *R* = 1

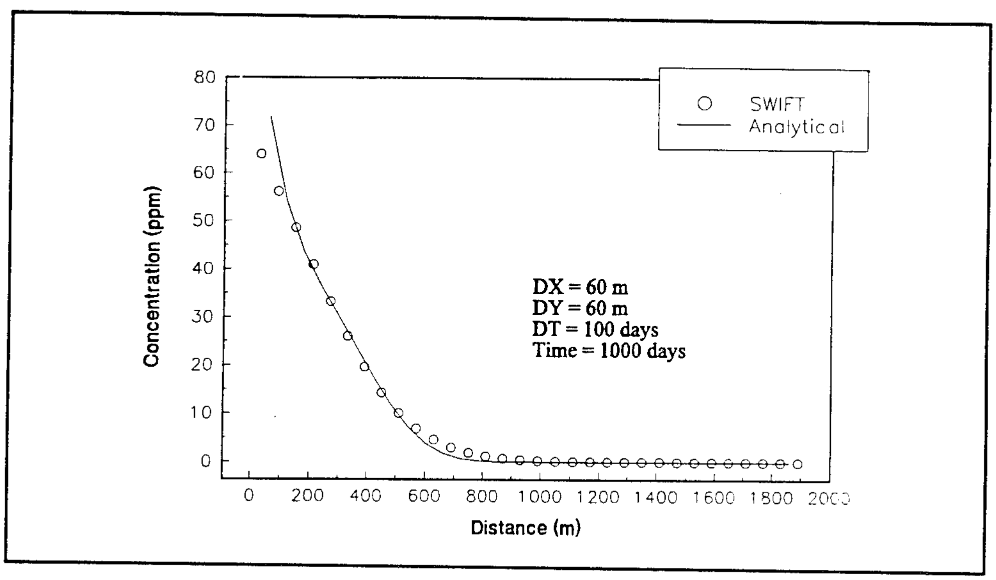


Figure 12. Simulated SWIFT results and analytical solutions for two-dimensional continuous source problem with DY = 60 m and retardation coefficient *R* = 1

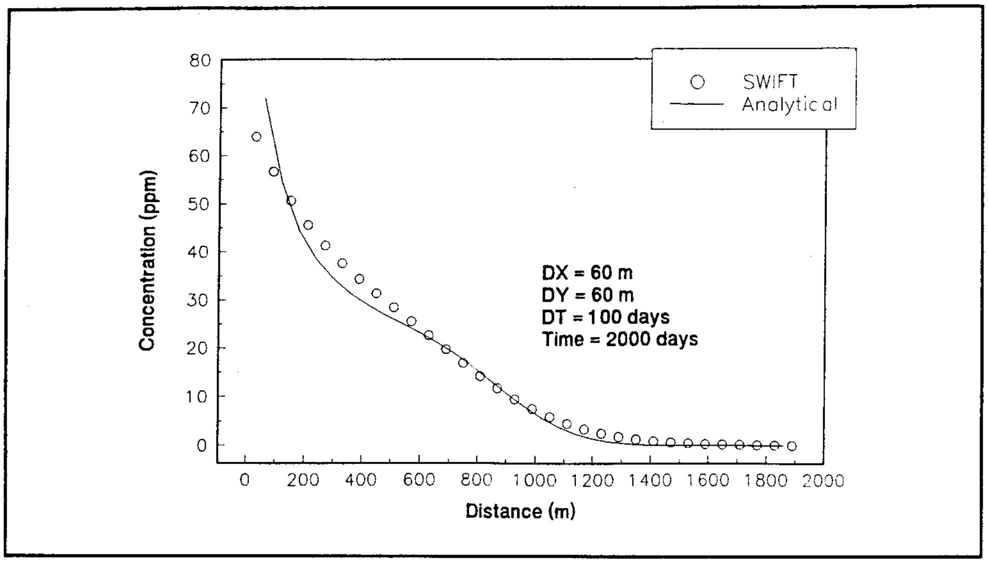


Figure 13. Simulated SWIFT results and analytical solutions for two-dimensional continuous source problem at time = 2,000 days

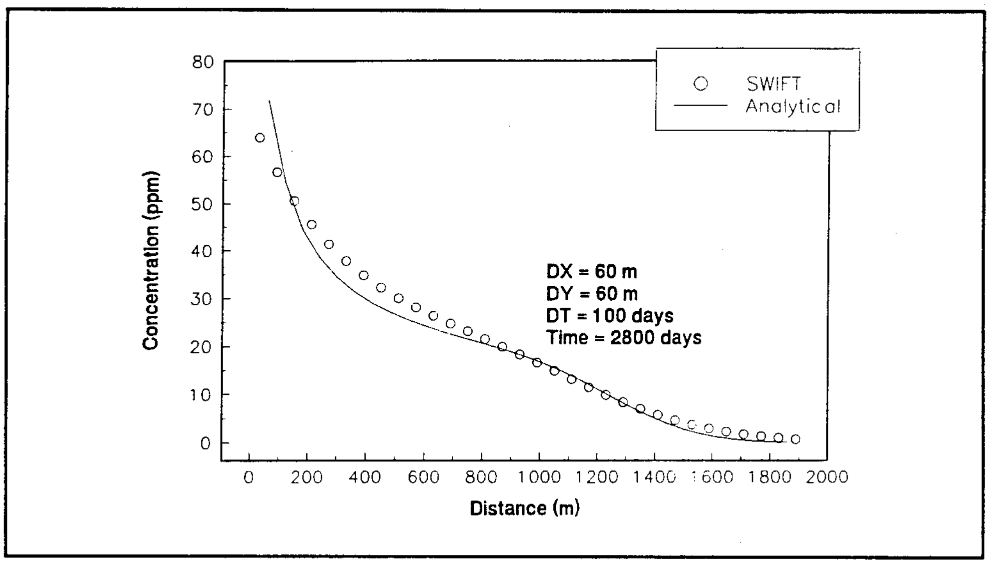


Figure 14. Simulated SWIFT results and analytical solutions for two-dimensional continuous source problem at time = 2,800 days

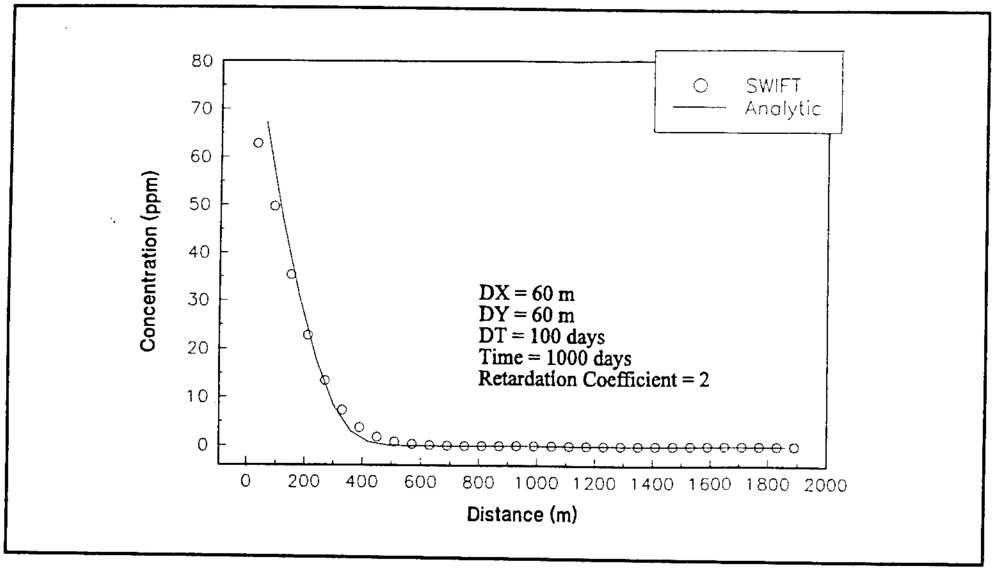


Figure 15. Simulated SWIFT results and analytical solutions for two-dimensional continuous point source problem with DY = 60 and retardation coefficient, $R = 2$

good agreement with the analytical solution. Beljin (1988) compared the same analytical solution with models such as MOC, SEFTRN, and RANDOM WALK and reported a similar conclusion.

Problem 6, Transport of a solute slug in a uniform groundwater flow field

Objectives. The purpose of this test is to evaluate SWIFT/486 for slug transport of a conservative solute using the radioactive transport option of the code in a Cartesian coordinate system.

Problem statement. This problem considers the slug injection of a conservative solute into a uniform two-dimensional flow field. The difference between this example and Example Problem 5 is the initial source condition. The initial concentration in this problem is a function of the source mass (M) as:

$$C(x,y,0) = \frac{M}{n}\,\delta(x,y) \tag{15}$$

where

M (M/L) = mass of the solute injected instantaneously into the aquifer per unit length of aquifer thickness

n = porosity

$\delta(x,y)$ $[1/L^2]$ = Dirac delta function

Input. Input parameters for Example Problem 6 (Table 10) are from Beljin (1988). SWIFT/486 requires input concentrations only in units of mass fraction. For this example, the aquifer thickness is 33.5 m, and the total mass injected over the aquifer thickness is 117.25 kg (3.5 kg/m × 33.5 m). The mass of pore water for a cell is $\Delta x \ \Delta y \ \Delta z \ \phi \ \rho_w$, where Δx, Δy, and Δz are the grid spacing in the x-, y-, and z-directions, respectively, ϕ is the porosity, and ρ_w is the water density. The mass fraction then is defined as follows:

$$mass \ \ fraction \equiv \frac{total \ \ mass \ \ injected}{mass \ of \ pore \ \ water \ in \ column} \tag{16}$$

Table 10
Input Parameters for Example Problem 6

Parameter	Value
Darcy velocity, v	2.0 m/d (6.56 ft/d)
Seepage velocity, $\bar{v}$	5.71 m/d (18.75 ft/d)
Porosity, n	0.35
Longitudinal dispersivity, α_L	4.0 m (13.12 ft)
Transverse dispersivity, α_T	1.0 m (3.28 ft)
Retardation factor, R	1
Decay constant, λ	0.0 1/d
Solute mass per unit aquifer thickness	3.5 kg/m (2.35 lb/ft)
Mass fraction	0.0004
Time, t	3.96, 10.59, and 16.59 d

Numerical specification. Two different rectangular grids, one with 40 elements in the x-direction, 5 elements in the y-direction, and 1 element in the z-direction, and another with the same number of elements in the x- and z-directions but 19 elements in the y-direction were used. The radionuclide transport option was used to solve this problem. The seepage velocity or Darcy velocity required by the analytical solution cannot be entered directly into SWIFT/486. The velocity is input implicitly into the numerical solution by assigning estimated pressure heads at the boundaries and the calculated hydraulic conductivity of the aquifer. Other specifications are given in the figures.

Output. Output for Example Problem 6 is included in Appendix A. Concentration (parts per million) versus distance (meter) profiles are plotted in Figures 16-21.

Results. The results of six different scenarios are given in Figures 16, 17, 18, 20, 21, and 22. In Figures 16, 17, and 18, although the locations of peak concentration for the numerical results and analytical solution are the same, there are some differences between the numerical and analytical results around the peak concentrations. By increasing the domain size in the y-direction from 25 m to 95 m, better results were obtained as shown in Figures 22 and 23. The reason for obtaining better results for domain with y = 96 m is due to providing enough space in y-direction for plume to spread out completely. The lateral increase of domain size did not change the results for time = 3.96 days. The discrepancy between the numerical and analytical results at time 3.96 days is because the software package of analytical solutions does not produce accurate results at this time (Beljin 1988). Beljin (1988) compared MOC, SEFTRAN, and RANDOM WALK simulated results with the same analytical solution and obtained similar agreements between the solutions.

SWIFT/486 is a relatively fast code. To provide the reader with an idea on the running speed of the code, the estimated CPU times for this problem are given in Figures 19 and 23. Note that the PC machine used in these calculations was a 486/DX2, 66 MHZ with 24 megabyte RAM. As expected, a comparison between Figures 19 and 23 shows that more CPU time is used for a case with 19 elements in the y-direction than for 5 elements in the y-direction.

This test showed that the radioactive transport option of SWIFT/486 can be used to simulate a conservative solute transport correctly within the assumptions of the selected analytical solution.

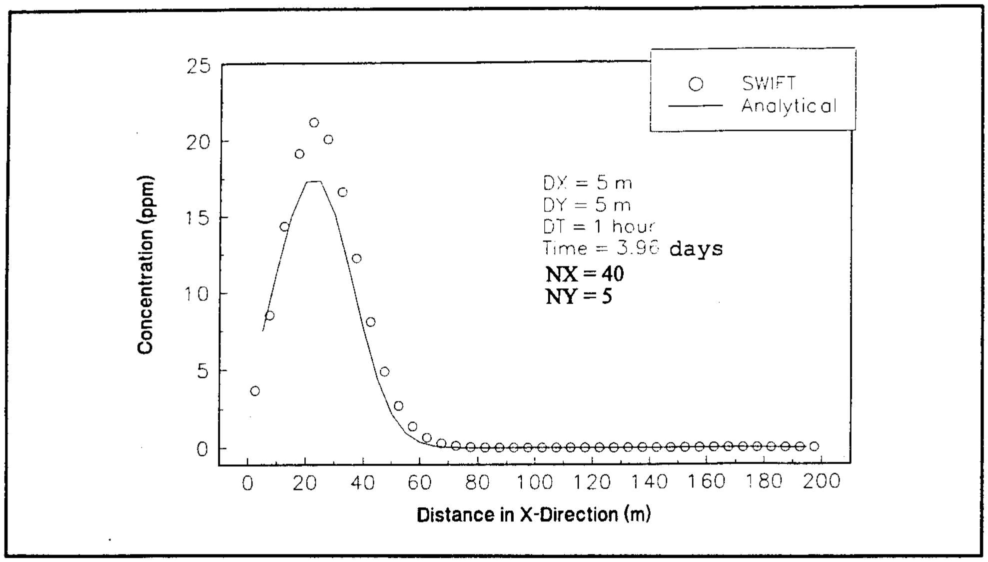


Figure 16. Simulated SWIFT/486 results and analytical solution for two-dimensional slug transport of a solute at time = 3.96 days

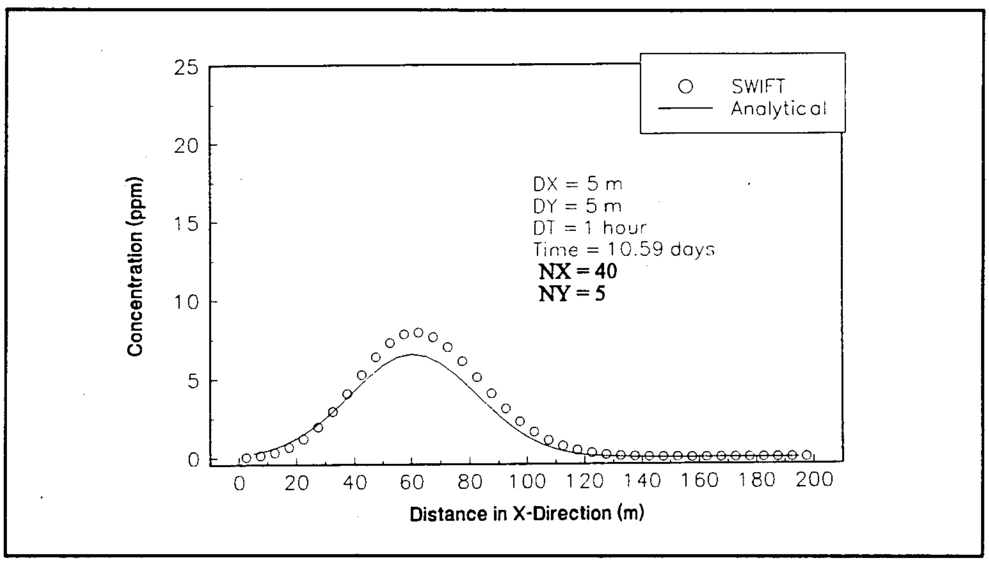


Figure 17. Simulated SWIFT/486 results and analytical solution for two-dimensional slug transport of a solute at time = 10.59 days

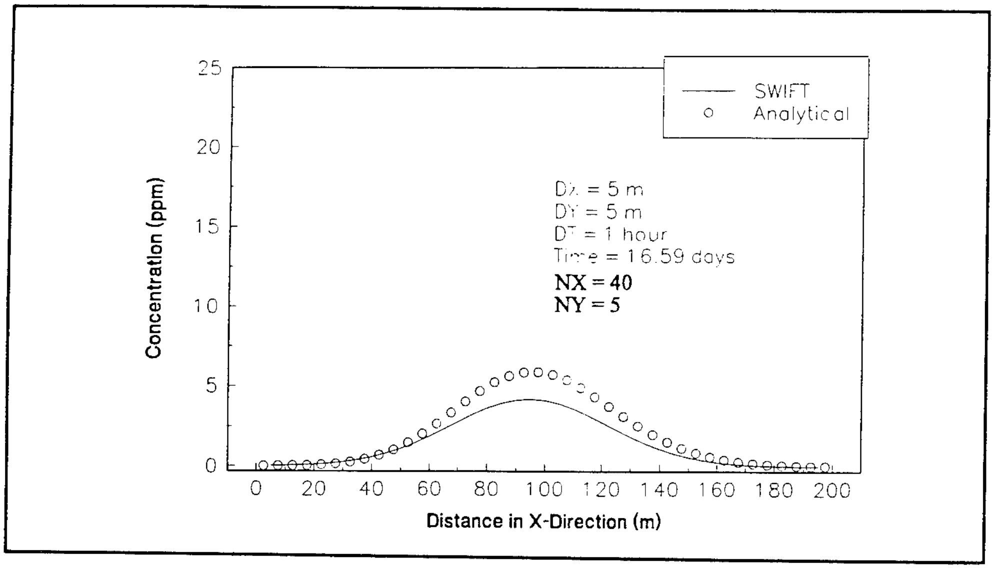


Figure 18. Simulated SWIFT/486 results and analytical solution for two-dimensional slug transport of a solute at time = 16.59 days

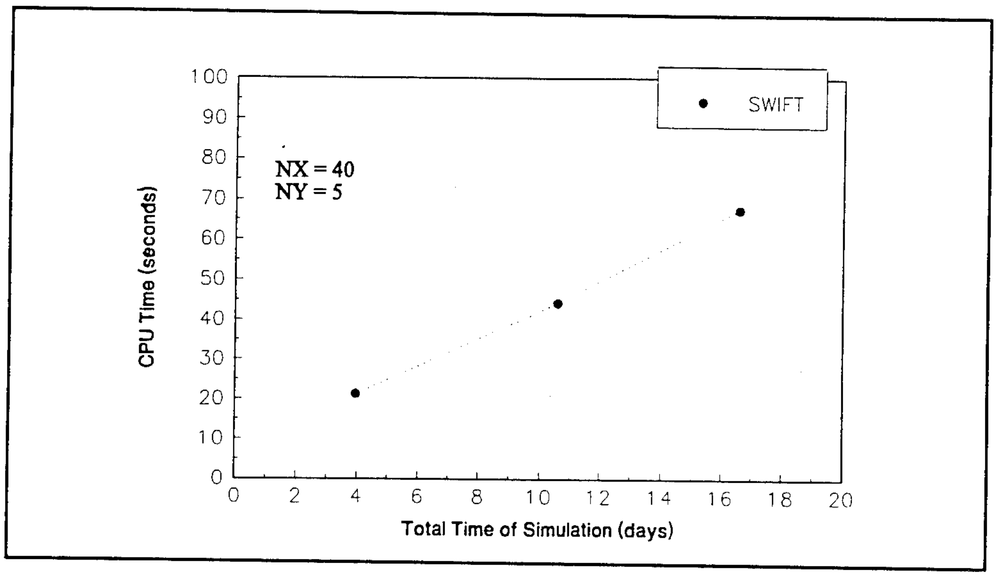


Figure 19. SWIFT/486 CPU time calculated for the simulations with NX = 40 and NY = 5

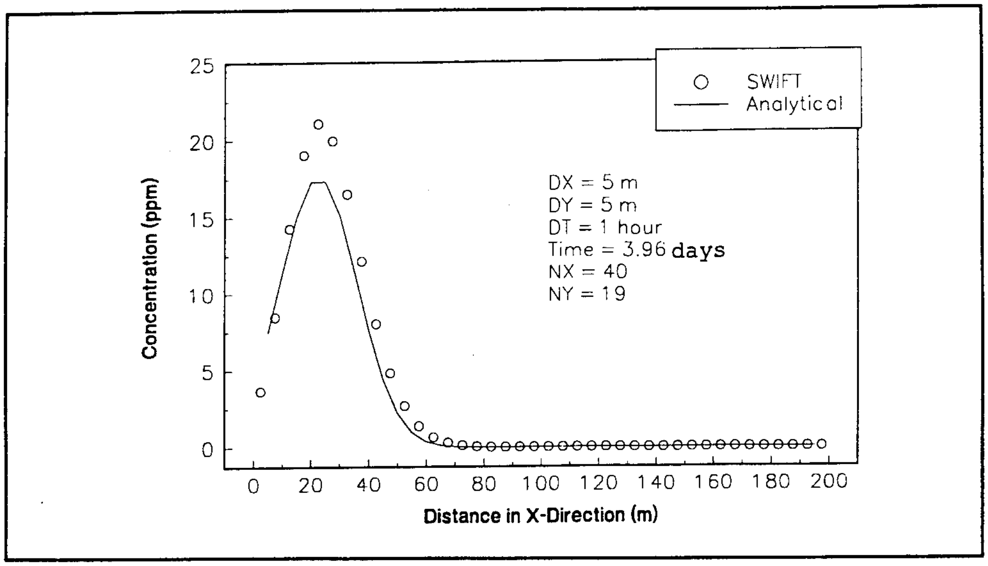


Figure 20. Simulated SWIFT/486 results and analytical solution for two-dimensional slug transport of a solute with NX = 40 and NY = 19 at time = 3.96 days

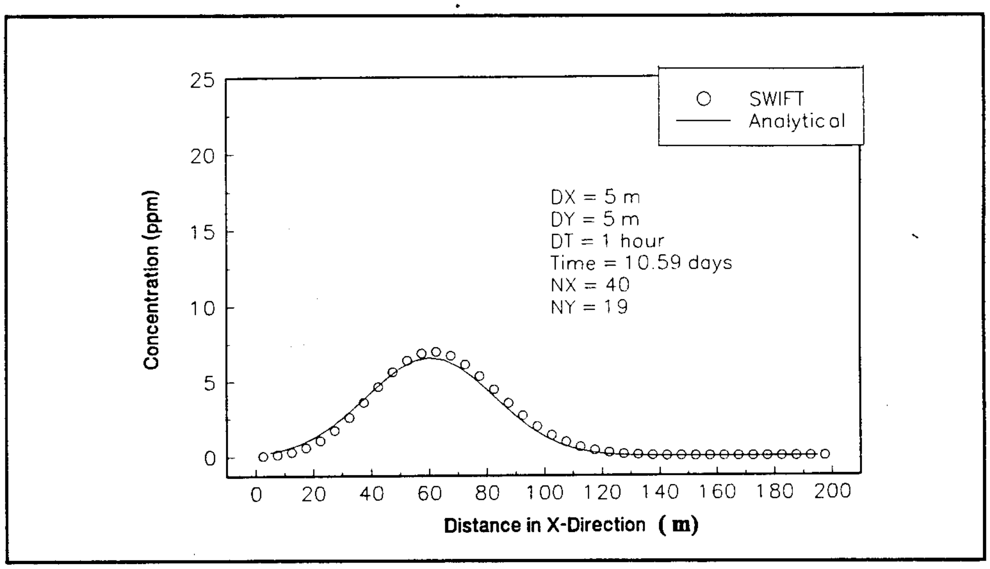


Figure 21. Simulated SWIFT/486 results and analytical solution for two-dimensional slug transport of a solute with NX = 40 and NY = 19 at time = 10.59 days

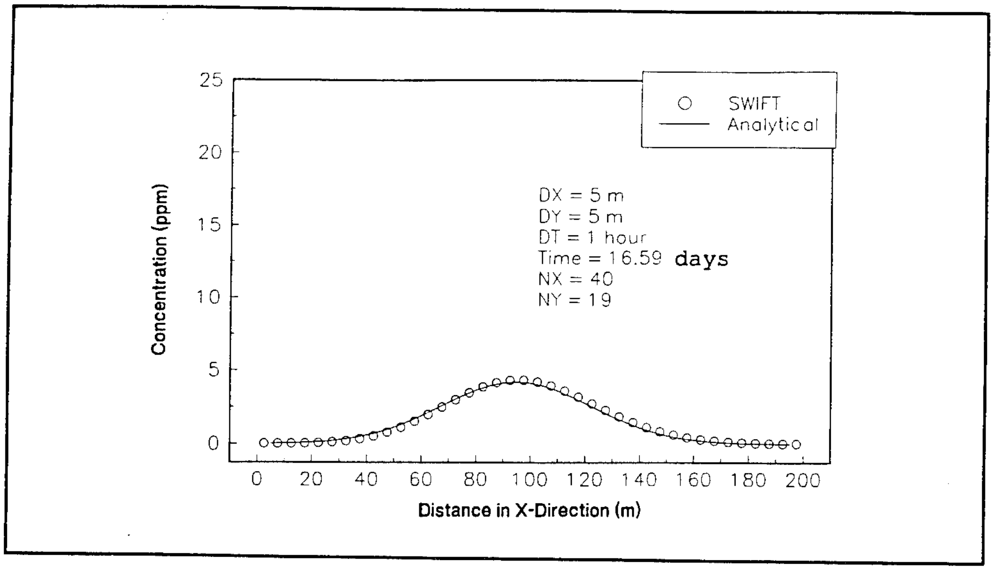


Figure 22. Simulated SWIFT/486 results and analytical solution for two-dimensional slug transport of a solute with NX = 40 and NY = 19 at time = 16.59 days

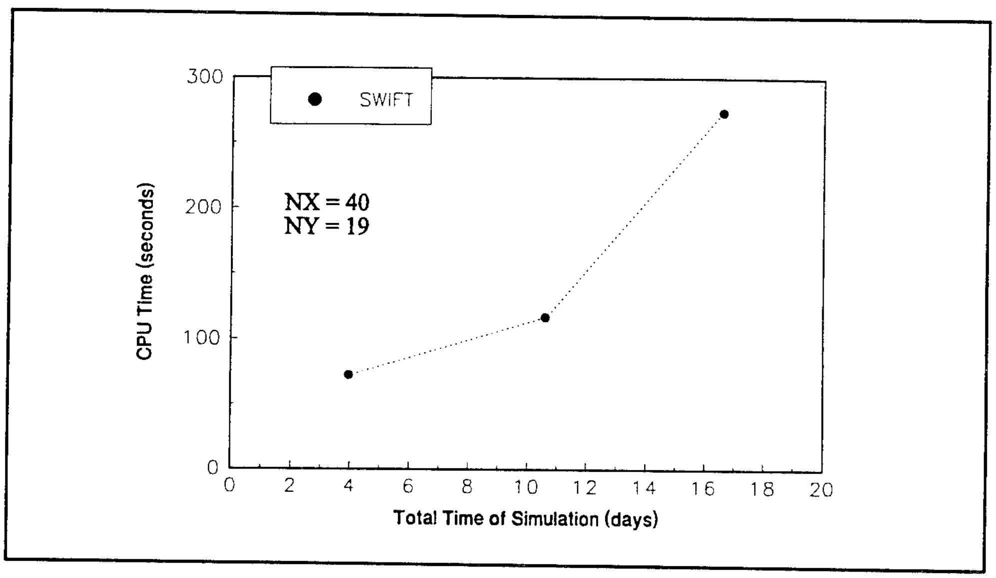


Figure 23. SWIFT/486 CPU time calculated for simulations with NX = 40 and NY = 19

4 Conclusions

Different versions of SWIFT/486 have been evaluated, tested, and applied at several sites by petroleum engineers and hydrogeologists (Ward et al. 1987). A list of some of the SWIFT/486 applications is given in Table 11 (GeoTrans 1994). The evaluation performed here complements previous SWIFT evaluations and applications (Table 11). In this investigation, the numerical accuracy of SWIFT/486 has been evaluated by a comparison of simulation results with analytical solutions. The selected analytical problems include a variety of initial and boundary conditions. The model also was reviewed for efficiency of coding by checking its speed of run, convenience of input/output by checking data input and output information, program portability by running it on two different computer systems (DOS and UNIX), and available diagnostic messages received during the simulations. Overall, SWIFT/486 is a relatively efficient code, requires an optimal amount of computer storage, and has sufficient diagnostic flags. SWIFT/486 simulations closely matched the analytical solutions to several simplified problems. SWIFT/486, however, has a few deficiencies which make its use inconvenient as described below.

The lack of a preprocessor for preparing input files is one of the drawbacks which impedes many users from selecting SWIFT/486. SWIFT/486 requires extensive data and input parameters. Input files require formatted structure. A SWIFT/486 user should also have adequate knowledge of thermodynamics, rock mechanics, and groundwater hydrology. There are many options in SWIFT/486 which make the application of the code very flexible for an experienced user and difficult for novices. Some of the options are described in this report; these and others can be found in Ward et al. (1993). One of the useful options in SWIFT/486, for instance, is that the daily variations in the injected density can be assigned by varying the solute mass fraction. There are some options in which the user must manipulate the input data in order to run the code. For example, SWIFT/486 cannot be used for pure advection problems (e.g., dispersivity coefficient = 0). For problems with zero dispersivity, values near zero must be input; otherwise, the control statement in the code will stop the simulation. This minor change of input parameter will allow the user to run the code and at the same time not deviate much from the actual input parameter. There are some options available in SWIFT/486 which are not defined in the user's manual. For example, the

Table 11
SWIFT Model Applications (GeoTrans 1994)

Site	State	Dimensions	Flow	Transport		
				Hazardous	Radioactive	Salt Water
Chem-Dyne	OH	3	Y	Y		
Ottati & Goss	NH	3	Y	Y		
Woburn	MA	3	Y	Y		
Fernald	OH	3	Y		Y	
Power Rd	OH	3	Y		Y	
S-Area	NY	3	Y	Y		
Savannah	SC	3	Y		Y	
Conserv Chem	MO	3	Y	Y		
Confidential-1	CA	3	Y	Y		
Confidential-2	CN	2	Y	Y		
Confidential-3	FL	3	Y	Y		Y
Confidential-4	MI	3	Y	Y		
Confidential-5	OK	3	Y	Y		
SWF WAT MGMN DIS	FL	2	Y			
BWIP	WA	3	Y		Y	
WIPP	NM	3	Y		Y	
Volusia, County	FL	3	Y			Y
Saudi Arabia		3	Y			Y
Borden Landfill	CAN	3	Y	Y		
Babylon Landfill	NY	2	Y	Y		
Ates Mobile	AL	3	Y			
Musquodoboit	CAN	2	Y			
East Kent Chalk	UK	2	Y			
Sacramento	CA	3	Y	Y		
Confidential	AK	3	Y	Y		

parameter METHOD in M3-1 record of input file can have a zero value; however, this is not defined in the user's manual. The future user's manual should cover all the new options available in this version of SWIFT/486.

SWIFT/486 has been developed to solve saturated zone problems; however, there is an option in SWIFT/486 that allows the user to simulate the dewatering (draining) of a saturated zone where the saturation may vary from 1.0 to 0.001. This option in SWIFT/486 is described under the Free Water Surface option (Reeves et al. 1986a). As described by Reeves et al. (1986a), there are some problems with this option. Therefore, this feature of SWIFT/486 was not evaluated here. SWIFT/486 is categorized as a saturated zone model.

SWIFT/486 has been developed using the parameters and terms derived for petroleum engineers. For example, it calculates pressure in PSI units rather than hydraulic head. Furthermore, the aquifer storage coefficient and the aquitard specific coefficient are calculated from the input values for water compressibility, rock compressibility, and effective porosity. For hydrogeology projects, the unit of the calculated parameters by SWIFT/486 could be converted into the units that are used by hydrogeologists, civil engineers, or environmental engineers.

For a radial (cylindrical geometry) coordinate system, SWIFT/486 calculates the Peclet number wrongly, therefore, the warning received by the user is not based on actual Peclet number of the problem and should be ignored.[1] The user may wish to calculate the Peclet number for this type of problem using other available formulation (Bear 1979).

Overall, this investigation showed that for selected problems with simplifying assumptions, SWIFT/486 performed very well.

[1] Personal Communication, 1994. D. Ward, Vice President, GeoTrans, Inc., Sterling, VA 20166.

References

Aziz K., and Settari, A. (1979). "Petroleum reservoir simulation," Applied Science Publication LTD, London, England.

Batu, V. (1984). "A finite element dual mesh method to calculate nodal Darcy velocities in nonhomogeneous and anisotropic aquifers," *Water Resources Research* 20(11), 1705-1717.

Bear, J. (1979). "Hydraulics of groundwater," McGraw-Hill 569.

Bear, J., and Braester, C. (1972). "Simultaneous flow of immiscible liquids in a fractured medium," Fundamentals of Transport Phenomena in Porous Media. Elsevier Publishing, 177-202.

Beljin, M. S. (1988). "Testing and validation of models for simulating solute transport in ground water, code intercomparison and evaluation of validation methodology." GWMI 88-11. International Ground Water Modeling Center, Colorado School of Mines.

Beljin, M. S. (1991). "SOLUTE- A program package of analytical models for solute transport in ground-water." IGWMC Report BAS-15, Version 2.03, International Ground Water Modeling Center, Colorado School of Mines.

Beljin, M. S. (1993). "SOLUTE- A program package of analytical models for solute transport in ground-water." IGWMC Report BAS-15, Version 3.0, International Ground Water Modeling Center, Colorado School of Mines.

Bredehoeft, J. D., and Pinder, G. F. (1973). "Mass transport in flowing ground-water," *Water Resources Research* 9, 194-209.

Campbell, J. E., Longsine, D. E., and Reeves, M. (1981). "Distributed velocity method of solving the convection-dispersion equation," *Advances in Water Resources* 4, 102-115.

Christie, I., Griffiths, D. F., and Mitchell, A. R. (1976). "Finite element methods for second order differential equations with significant first derivatives," International Journal of Numerical Methods in Engineering 10, 1289-1396.

Dillon, R. T., Lantz, R. B., and Pahwa, S. B. (1978). "Risk methodology for geologic disposal of radioactive waste: The Sandia Waste-Isolation Flow and Transport(SWIFT) model," NUREG/CR-0424, SAND78-1267 Sandia National Laboratories, Albuquerque, NM.

Garder, A. O., Peaceman, D. W., and Pozzi, A. L. (1964). "Numerical calculation of multidimensional miscible displacement by method of characteristics," Society of Petroleum Engineers Journal 4, 26-36.

GeoTrans. (1994). Miscellaneous paper, Sterling, VA 20166.

Golden Software. (1993). "Surfer program," Golden, Colorado 80402.

Hantush, M. S. (1960). "Modification of the theory of leaky aquifers," *Journal of Geophysical Research* 65, 3713-3725.

Hantush, M. S. (1961). "Drawdown around a partially penetrating well," American Society of Civil Engineers Proc. 87(Hy4), 83-98.

Hoopes, J. A., and Harleman, D. R. F. (1967). "Dispersion in radial flow from a recharge well," *Journal of Geophysical Research* 72(14), 3595-3607.

Intercomp. (1976). "A model for calculating effects of liquid waste disposal in deep saline aquifer," U.S. Geological Society, WRI 76-61, Reston, Virginia.

Intera. (1979). "Revision of the documentation for a model for calculating effects of liquid waste disposal in deep saline aquifer," U.S. Geological Society, WRI 79-96, Reston, Virginia.

Nolen, J. S., and Berry, D. W. (1972). "Tests of the stability and time-step sensitivity of semi-implicit reservoir simulation techniques," Society of Petroleum Engineers Journal, SPE 2981, 253-266.

Nolen, J. S., van Hartlemann, G., Meister, S., Kleinitz, W., and Heiblinger, Jr. (1974). "Numerical simulation of the solution mining process," Society of Petroleum Engineers Journal, SPE 4850.

Pinder, G. F. (1973). "A Galerkin-finite element simulation of groundwater contamination on Long Island, New York," *Water Resources Research* 9(6), 1657-1669.

Preuss, K., and Narasimhan, T. N. (1982). "A practical method for modeling fluid and heat flow in fractured porous media," Society of Petroleum Engineers Journal, SPE 10509.

Price, H. S., Cavendish, J. S., and Varga, R. S. (1968). "Numerical methods of higher-order accuracy for diffusion convection equations," Society of Petroleum Engineers Journal, September, 1968.

Reeves, M., and Cranwell, R. M. (1981). "User's manual for the Sandia Waste-Isolation Flow and Transport Model (SWIFT) Release 4.81," SAND 81-2516, NUREG/CR-2324, Sandia National Laboratories, Albuquerque, NM.

Reeves, M., Ward, D. S., Johns, N. D., and Cranwell, R. M. (1986a). "Theory and implementation of SWIFT II, The Sandia Waste-Isolation Flow and Transport Model for Fractured Media, Release 4.84," NUREG/CR-3328, SAND83-1159, Sandia National Laboratories, Albuquerque, New Mexico.

Reeves, M., Ward, D. S., Davis, P. A., and Bonano, E. J. (1986b)." SWIFT II, Self-teaching curriculum: Illustrative problems for the Sandia Waste-Isolation Flow and Transport Model for Fractured Media," NUREG/CR-3925, SAND84-1586, Sandia National Laboratories, Albuquerque, New Mexico.

Reeves, M., Ward, D. S., Johns, N. D., and Cranwell, R. M. (1986c). "Data input guide for SWIFT II, The Sandia Waste-Isolation Flow and Transport Model for Fractured Media, Release 4.84," NUREG/CR-3161, SAND83-0242, Sandia National Laboratories, Albuquerque, New Mexico.

Ross, B., Mercer, J. W., Thomas S. D., and Lester, B. H. (1982). "Benchmark problems for repository sitting models," NUREG/CR-3097, U.S. Nuclear Regulatory Commission.

Salford Software. (1993). "FTN77/x86 Reference Manual," Califford, PA 18413.

Theis, C. V. (1935). "The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground water storage." Am. Geophys. Union Trans., 16, 519-524.

Ward, D. S., Reeves, M., and Duda, L. E. (1984). "Verification and field comparison of the Sandia Waste-Isolation Flow and Transport Model (SWIFT)." NUREG/CR-3316, SAND83-1154, Sandia National Laboratories, Albuquerque, New Mexico.

Ward, D. S., Buss, D. R., Mercer, J. W., and Hughes, S. S. (1987). "Evaluation of a groundwater corrective action at the Chem-Dyne Hazardous Waste Site using a telescopic mesh refinement modeling approach." *Water Resour. Res* 23, 603-617

Ward, D. S. (1991). "Data input guide for SWIFT/386" Version 2.52, GeoTrans, Sterling, VA.

Ward, D. S., Harrover, A. L., and Vincent, A. H. (1993). "Data Input guide for SWIFT/486, The Sandia Waste-Isolation Flow and Transport Model for Fractured Media." Release 2.53. GeoTrans, Inc., Sterling, VA 20166.

Ward, D. S., Reeves, M., and Duda, L. E. (1984). "Verification and field comparison of the Sandia Waste-Isolation Flow and Transport model (SWIFT)." NUREG/CR-3316, SAND83-1154, Sandia National Laboratories, Albuquerque, NM.

Wilson, J. L., and Miller, P. J. (1978). "Two-dimensional plume in uniform ground-water flow." Journal of the Hydraulics Division (HY4) 503-514.

Appendix A
Input and Output
of SWIFT/486 Simulations

Appendix A provides a complete list of input and output parameters used in this evaluation.

```
PROB. 1.0 (MR) ++ FLOW VERIFICATION - SI (METRIC) - RADIAL COORDS
FULLY PENETRATING WELL WITH CONSTANT DISCHARGE (THEIS,1935)
  1  0  0  0  0  0  0  1  0 21 000                    M-2
 50  1  1  3  0  1  0  2  0  1  0  0000               M-3-1
  0  0  0  0                                          M-3-2
0.     1.668E-07 0.     1.     1.                     R1-1
1.     1.     1.     1.     1.     1.     1.          R1-2
120.    5.977E+04 21.1    999.5   999.5               R1-3
  0  0  0  2                                          R1-6
21.1   .001    21.1    .001                           R1-7
0.     21.1                                           R1-11
10.    21.1                                           R1-11
  0  0                                                R1-12
21.1    5.977E+04 0.     0.                           R1-16
.1143   .4755   6096.   0.                            R1-22
3.048    3.281E-04 3.281E-04 0.20    0.0              R1-23
000000                                                R1-26-BLNK
  3  1                                                R1-27
  2  0  1                                             R1-29
.001    .6096   6096.   360.                          R1-31
000000                                                R1-33-BLNK
  0  0  0                                             I-1
0.                                                    R1A-1
  1  100000000000                                     R2-1
  2                                                   R2-4
 3.00E-03 0.                                          R2-5
  1  1  1  1  1  1                                    R2-7-1
4.408E-03  1.00E10  21.1   0.                         R2-7-2
  2  29  1  1  1  1                                   R2-7-1
 1.00E10  1.00E10  21.1   0.                          R2-7-2
```

```
 000000                                           R2-7-BLNK
864. 864. 000000                                  R2-12
  1101  -11 000 00000                             R2-13
  0 0 0 0 0 0 0 0 0 0 00                          R2-1
 8.64E+06 0.    0.    0. 6.894E+04 0. 8.64E+06 8.64E+04
  1 1 0 1  -1 1 0 0 0 0 0000                      R2-13
  0  0  0  1  0  0  0  0  0  0 0         R2-1-STOP
  1   PRODUCTION WELL (R=0.375 FT=0.1143 M)        P-2
0.     8.64E+06  2.00E+05 0.  1.00E+05 0.     0.   P-3-1
0.     0.     0. 0.0000                            P-3-2
864.     3.192E04   0. 0. 0. 0.                    P-4
 8.726E04 2.113E04   0. 0. 0. 0.                   P-4
 2.168E05 1.900E04   0. 0. 0. 0.                   P-4
 4.110E05 1.750E04   0. 0. 0. 0.                   P-4
 7.030E05 1.625E04   0. 0. 0. 0.                   P-4
 1.140E06 1.512E04   0. 0. 0. 0.                   P-4
 1.797E06 1.405E04   0. 0. 0. 0.                   P-4
 2.782E06 1.303E04   0. 0. 0. 0.                   P-4
 4.259E06 1.204E04   0. 0. 0. 0.                   P-4
 6.471E06 1.106E04   0. 0. 0. 0.                   P-4
 8.640E06 1.038E04   0. 0. 0. 0.                   P-4
-100.  000 00                                      P-END
   2   OBSERVATION WELL (R=328 FT = 100 M)         P-2
0.  8.64E+06  2.00E+05 0.  1.00E+05 0.   0.        P-3-1
0.   0.   0.   0. 000                              P-3-2
864.      5.974E04    0000                         P-4
 8.726E04 5.275E04     0000                        P-4
 2.168E05 5.066E04     0000                        P-4
 4.110E05 4.918E04     0000                        P-4
 7.030E05 4.793E04     0000                        P-4
 1.140E06 4.680E04     0000                        P-4
 1.797E06 4.574E04     0000                        P-4
 2.782E06 4.472E04     0000                        P-4
 4.259E06 4.372E04     0000                        P-4
 6.471E06 4.274E04     0000                        P-4
 8.640E06 4.207E04     0000                        P-4
-100.  00000                                       P-END
 0                                                 P-STOP
NOTE: WELL INDEX = 2(PI)(3.281E-04)(3.048)/LN(.4755/.1143)=4.408E-3
```

This page is Blank.

```
**************************************************
*                                                *
*   >>> S W I F T / 4 8 6 <<<                    *
*                                                *
**************************************************
*                                                *
*         SANDIA Waste-Isolation                 *
*         Flow and Transport in                  *
*       Porous and/or Fractured Media            *
*                                                *
*     Quality Assurance Version 2.53             *
*                                                *
*        --- Transport Equations ---             *
* Fluid free-water surface (steady or transient) *
*     Energy-temperature (transient)             *
* Dominant specie-brine (steady or transient)    *
*  Trace species-radionuclides (transient)       *
*                                                *
*         --- Code evolution ---                 *
*    Intera Technologies, Inc. 1975-1982         *
*         GeoTrans, Inc. 1982-1993               *
*                                                *
*       Copyright GeoTrans, Inc. 1993            *
*                                                *
**************************************************
```

```
*** TITLE CARDS ***
-------------------


*****************************************************************************
*                                                                           *
* PROB. 1.0  (MR) ++ FLOW VERIFICATION - SI (METRIC) - RADIAL COORDS        *
*                                                                           *
* FULLY PENETRATING WELL WITH CONSTANT DISCHARGE (THEIS,1935)               *
*                                                                           *
*****************************************************************************


    *** INTEGER CONTROL SPECIFICATION ***
    ------------------------------------


    *** EXECUTION CONTROL OPTIONS ***
  EQUATIONS SOLVING INDEX ............. NCALL.  1
  RESTART RECORD NUMBER ............... RSTST..000E+00
  WELLBORE DATA KEY ................... ISURF.  0
  FREE WATER SURFACE OPTION ........... IFREE.  0
  PLOTTING KEYS - PRESSURE ............ NPLP .  0
          - TEMPERATURE ......... NPLT .  0
          - CONCENTRATION ....... NPLC .  0
  UNITS ARE IN (0=ENGLISH, 1=METRIC) .. IUNIT.  1
  NUCLIDE MONITOR (UNIT9) OPTION ...... LBIO .  0
  MAP[ij] {j: 0=NO,1=ASCII,2=BINARY) .. LMAPIT 21
        {i: 0=Datum, 1=Envr H, 2=Fresh Wat H}
  MASS BALANCE AUXILIARY FILE (UNIT17). LMBAL   0
  AQUIFER INFLUENCE FUNC FILE (UNIT18). LAIF .  0
  PRINT REQUENCY FOR L2SOR ............ L2SORP  5

   *** PROBLEM DIMENSIONS ***
  NUMBER OF BLOCKS IN X-DIRECTION ..... NX ...  50
  NUMBER OF BLOCKS IN Y-DIRECTION ..... NY ...  1
  NUMBER OF BLOCKS IN Z-DIRECTION ..... NZ ...  1
```

```
INDEX OF RESERVOIR HETEROGENEITY .... HTG ..  3
NO OF RADIOACTIVE COMPONENTS ........ NCP ..  0
NUMBER OF ROCK TYPES ................ NRT ..  1
OUTPUT CONTROL INDEX ................ KOUT .  0
PRINT CONTROL KEY ................... PRT ..  1
MAX NO OF RADIOACTIVE SOURCE BLOCKS . NSMAX   0
MAX NO OF AQUIFER INFL FN BLOCKS .... NABLMX  1
MAX NO OF SURFACE RECHARGE BLOCKS ... NRCHMX  0
METHOD OF SOLUTION .................. METHOD  0


 *** WASTE INVENTORY TABLE ENTRIES ***
NUMBER OF INTERPOLATION TIMES ....... NTIME   0
REPOSITORY AREAL HEATING CONTROL .... KHEAT   0
NUMBER OF REPOSITORY BLOCKS ......... NREPB   0

 *** LOCAL (MATRIX) SUBSYSTEM CONTROL ***
SOLUTION CONTROL .................... KSLVD   0
NUMBER OF LOCAL ROCK TYPES .......... NRTD .  0
OUTPUT CONTROL KEY .................. KOUTD   0


 ***  UTILIZATION OF COMMON ARRAY STORAGE  ***
 --------------------------------------------

          .............................................................
          .                .              .       .
          .  BLANK COMMON  .       LABELLED COMMON          .     .
          .----------------.-------------------------------.     .
          .  REAL  INTEGER .         REAL        INTEGER  .     .
          . ------- ------- . --------------------------- --------- .
          .                .   G       G2      G3      IG   .  TOTAL .
          .                .  ------- ------- ------- ------- . ------- .
          .                .                           .       .
CODE DIMENSIONS : .  16403   4469  .   105000   85000   140000    35000  .  365000 .
          .                .                           .       .
DATA REQUIREMENTS: .  16403   4469  .    4879    1204    1501      227  .   7811 .
          .                .                           .       .
          .............................................................
```

```
 *** GLOBAL (FRACTURE) AND FLUID DATA ***
WATER COMPRESSIBILITY .............. CW .... 0.00000E+00 (1/PA)
ROCK COMPRESSIBILITY ............... CR .... 1.66800E-07 (1/PA)
WATER THERMAL EXPANSION FACTOR ..... CTW ... 0.00000E+00 (1/DEG.C)
WATER HEAT CAPACITY ................ CPW ... 1.00000E+00 (J/KG-DEG.C)
ROCK HEAT CAPACITY ................. CPR ... 1.00000E+00 (J/CU.M-DEG.C)
MEDIUM THERMAL COND. IN X-DIR ...... UKTX .. 1.00000E+00 (J/M-SEC-DEG.C)
MEDIUM THERMAL COND. IN Y-DIR ...... UKTY .. 1.00000E+00 (J/M-SEC-DEG.C)
MEDIUM THERMAL COND. IN Z-DIR ...... UKTZ .. 1.00000E+00 (J/M-SEC-DEG.C)
LONGITUDINAL DISPERSIVITY FACTOR ... ALPHL.. 1.00000E+00 (M)
TRANSVERSE DISPERSIVITY FACTOR ..... ALPHT.. 1.00000E+00 (M)
EFFECTIVE MOLECULAR DIFFUSION ...... DMEFF.. 1.00000E+00 (SQ.M/SEC)
ROCK DENSITY (SOLID PARTICLE) ...... BROCK.. 1.20000E+02 (KG/CU.M)
REF. PRESSURE FOR FLUID DENSITIES .. PBWR .. 5.97700E+04 (PA)
REF. TEMP. FOR FLUID DENSITIES ..... TBWR .. 2.11000E+01 (DEG.C)
FLUID DENSITY (AT C=0.0) ........... BWRN .. 9.99500E+02 (KG/CU.M)
BRINE FLUID DENSITY (AT C=1.0) ..... BWRI .. 9.99500E+02 (KG/CU.M)
```

```
     TEMPERATURE-VISCOSITY TABLE
..........................................
TEMPERATURE (DEG.C)    VISCOSITY (PA-SEC)
..........................................

     AQUIFER FLUID (AT C=0.0)
  2.11000E+01          1.00000E-03

     SATURATED BRINE (AT C=1.0)
  2.11000E+01          1.00000E-03


DEPTH-TEMPERATURE INITIALIZATION
.................................
DEPTH (M)    TEMPERATURE (DEG.C)
.................................

 0.0000E+00        21.10
  10.00          21.10
```

```
*** REFERENCE CONDITIONS FOR FLUID AND GLOBAL SYSTEM ***
REFERENCE FLUID TEMPERATURE ........ TO .... 2.11000E+01 (DEG.C)
INITIAL AND REFERENCE PRESSURE ..... PINIT 5.97700E+04 (PA)
REFERENCE DEPTH OF INITIAL P & T ... HINIT . 0.00000E+00 (M)
DEPTH FROM REF. PLANE TO DATUM ..... HDATUM 0.00000E+00 (M)
REFERENCE WATER DENSITY (AT C=0.0) . BW0 ... 9.99500E+02 (KG/CU.M)
REFERENCE WATER INTERNAL ENERGY .... UW0 ... 8.84358E+04 (J/KG)
REFERENCE WATER ENTHALPY ........... ETH ... 8.84956E+04 (J/KG)
```

```
*** CYLINDRICAL GLOBAL SYSTEM DATA ***
WELLBORE RADIUS .................... RW .... 0.1143     (M)
RADIUS TO CENTER OF FIRST COLUMN ... R1 .... 0.4755     (M)
RESERVOIR EXTERIOR RADIUS .......... RE ....  6096.     (M)
DEPTH TO CENTROID OF BLOCK (1,1,1) . DEPTH . 0.0000E+00 (M)
```

LAYERED DESCRIPTION

LYR NO.	THICKNESS (M)	KHORZ (M/SEC)	KVERT (M/SEC)	POROSITY FRACTION	ROCK HEAT CAP (J/CU.M-DEG.C)
1	3.05	3.281E-04	3.281E-04	0.200	0.000E+00

RADIAL GRID BLOCK DATA

BLOCK NO.	RADII - (M) CENTER	BOUNDARY
1	0.4755	0.1143
2	0.5756	0.5240
3	0.6968	0.6343
4	0.8435	0.7678
5	1.021	0.9294
6	1.236	1.125
7	1.496	1.362
8	1.811	1.649
9	2.193	1.996
10	2.654	2.416
11	3.213	2.925
12	3.889	3.540

13	4.708	4.286
14	5.699	5.188
15	6.899	6.280
16	8.352	7.602
17	10.11	9.203
18	12.24	11.14
19	14.81	13.49
20	17.93	16.32
21	21.71	19.76
22	26.28	23.92
23	31.81	28.96
24	38.51	35.05
25	46.62	42.43
26	56.43	51.37
27	68.31	62.18
28	82.69	75.27
29	100.1	91.12
30	121.2	110.3
31	146.7	133.5
32	177.6	161.6
33	214.9	195.7
34	260.2	236.9
35	315.0	286.7
36	381.3	347.1
37	461.6	420.1
38	558.7	508.6
39	676.4	615.7
40	818.8	745.3
41	991.1	902.2
42	1200.	1092.
43	1452.	1322.
44	1758.	1600.
45	2128.	1937.
46	2576.	2345.
47	3119.	2839.
48	3775.	3437.
49	4570.	4160.
50	5532.	5036.

DATA FOR CARTER-TRACY WATER INFLUX CALCULATIONS

KH (SQ.M/SEC)	PHIH (M)	AQUIFER RADIUS RAQ (M)	ANGLE THETA (DEGREES)
1.0000E-03	0.6096	6096.	360.0

CARTESIAN GRID ALLOCATION ASSUMES A CONSTANT
BLOCK THICKNESS. TO ADJUST FOR THIS, ENTER R1-31 INPUT

CARTER-TRACY INFLUENCE FUNCTION

DIMENSIONLESS TIME TD	DIMENSIONLESS PRESSURE P(TD)	ACTUAL TIME (SECS)
1.000E-02	0.112	3.704E+05
5.000E-02	0.229	1.852E+06
1.000E-01	0.315	3.704E+06
0.150	0.376	5.556E+06
0.200	0.424	7.408E+06
0.300	0.503	1.111E+07
0.500	0.616	1.852E+07
0.700	0.702	2.593E+07
1.00	0.802	3.704E+07
1.50	0.927	5.556E+07
2.00	1.02	7.408E+07
3.00	1.17	1.111E+08
5.00	1.36	1.852E+08
7.00	1.50	2.593E+08
10.0	1.65	3.704E+08
15.0	1.83	5.556E+08
20.0	1.96	7.408E+08

30.0	2.15	1.111E+09
40.0	2.28	1.482E+09
50.0	2.39	1.852E+09
60.0	2.48	2.222E+09
70.0	2.55	2.593E+09
80.0	2.62	2.963E+09
90.0	2.67	3.333E+09
100.	2.72	3.704E+09
200.	3.06	7.408E+09
300.	3.26	1.111E+10
500.	3.52	1.852E+10
700.	3.68	2.593E+10
1.000E+03	3.86	3.704E+10

```
AQUIFER COEFFICIENTS (DIMENSIONLESS)
....................................

       1         2         3         4         5         6         7         8         9        10

1  0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00

      11        12        13        14        15        16        17        18        19        20

1  0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00

      21        22        23        24        25        26        27        28        29        30

1  0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00

      31        32        33        34        35        36        37        38        39        40

1  0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00

      41        42        43        44        45        46        47        48        49        50

1  0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00  1.0000


AQUIFER-INFLUENCE FUNCTION BLOCK NUMBERS
.........................................
```

	1	2	3	4	5	6	7	8	9	10
1	0	0	0	0	0	0	0	0	0	0
	11	12	13	14	15	16	17	18	19	20
1	0	0	0	0	0	0	0	0	0	0
	21	22	23	24	25	26	27	28	29	30
1	0	0	0	0	0	0	0	0	0	0
	31	32	33	34	35	36	37	38	39	40
1	0	0	0	0	0	0	0	0	0	0
	41	42	43	44	45	46	47	48	49	50
1	0	0	0	0	0	0	0	0	0	1

DEPTH OF BLOCK CENTERS BELOW REFERENCE PLANE (M)
(Measured positive downwards)

....

All values for this array equal 0.0000E+00

*** SALT DISSOLUTION ***

(PRODUCT OF DISSOLUTION RATE AND SOLUBLE FRACTION)

ROCK TYPE	PRODUCT (1/SEC)
1	0.0000E+00

GLOBAL PORE VOLUME (M**3)

	1	2	3	4	5	6	7	8	9	10
1	0.50075	0.24468	0.35855	0.52540	0.76991	1.1282	1.6533	2.4226	3.5501	5.2022
	11	12	13	14	15	16	17	18	19	20
1	7.6232	11.171	16.369	23.987	35.150	51.509	75.479	110.61	162.08	237.51
	21	22	23	24	25	26	27	28	29	30
1	348.04	510.00	747.35	1095.1	1604.8	2351.6	3446.0	5049.7	7399.7	10843.
	31	32	33	34	35	36	37	38	39	40
1	15890.	23284.	34120.	49999.	73267.	1.07363E+05	1.57328E+05	2.30544E+05	3.37834E+05	4.95053E+05
	41	42	43	44	45	46	47	48	49	50
1	7.25438E+05	1.06304E+06	1.55775E+06	2.28269E+06	3.34500E+06	4.90168E+06	7.18280E+06	1.05255E+07	1.54238E+07	2.26017E+07

GLOBAL ROCK TYPES

....

All values for this array equal 1

GLOBAL X-DIRECTION TRANSMISSIVITY (SQ.M/SEC)
....

All values for this array equal 3.2888E-02

GRID BLOCK CENTER ELEVATION ABOVE DATUM PLANE (M)
(Measured positive upwards)
....

All values for this array equal 0.0000E+00

GRID BLOCK THICKNESS (M)
....

All values for this array equal 3.048

INITIAL GLOBAL PRESSURE AT ELEVATION H (PA)
....

All values for this array equal 5.9770E+04

INITIAL GLOBAL PRESSURE AT DATUM ELEVATION (PA)
....

All values for this array equal 5.9770E+04

INITIAL GLOBAL TEMPERATURES (DEG.C)
....

All values for this array equal   21.10

INITIAL GLOBAL BRINE CONCENTRATIONS (FRACTION)
....

All values for this array equal 0.0000E+00

```
*** STATE VARIABLE INITIALIZATION ***
-------------------------------------

        AMOUNT IN-PLACE
        ...............
      WATER  7.11326E+10 (KG)
     ENERGY  6.29067E+15 (J)
      BRINE  0.00000E+00 (KG)
```

*** RECURRENT DATA SPECIFICATION BEGINNING AT TIME = 0.0000E+00 (SECS) ***

INPUT CONTROL OPTIONS

INDQ	IWELL	IMETH	ITHRU	IRSS	IPROD	IOPT	INDT	ICLL	IRCH	ICHCR
1	1	0	0	0	0	0	0	0	0	0

METHOD = 1 WT FACTOR = 1.0

*** WELL SPECIFICATION ***

TOTAL NUMBER OF WELLS = 2

WELL RATES (CU. M/SEC)
(POSITIVE-PRODUCTION-OUT : NEGATIVE-INJECTION-IN)

1	2
3.000E-03	0.000E+00

WELL DATA

WELL NO	I	J	PERFS K1	K2	SPEC OPTN	WI (SQ.M/SEC)	BHP (PA)	TINJ (DEG.C)	CINJ FRAC.
1	1	1	1	1	1	4.408E-03	1.000E+10	21.1	0.000

```
 2  29   1   1   1    1  1.000E+10  1.000E+10     21.1      0.000


                TIME STEPPING AND OUTPUT CONTROL OPTIONS
 ..........................................................................
  TCHG      DT  IO1 IO2 IO3 IO4 IO5 IO6 IO8 RSTWR MAP MDAT IIPRT IO5D IO8D IIPRTD
 ..........................................................................

 8.640E+02 8.640E+02  1   1   0   1  -1   1   0   0   0   0   0   0   0   0


-------------------------------------------------------------------------------------------


  ELAPSED SIMULATION TIME  864.0    SECS  ( 1.0000E-02 DAYS   , 2.7397E-05 YEARS )
 ***************************************************************************

 TIME STEP NUMBER    1   NUMBER OF OUTER ITERATIONS   1    CURRENT TIME STEP  864.0    SECS

                         FLUID (KG)       ENERGY (J)       BRINE (KG)
                        ............    ............    ............
 (GLOBAL+LOCAL)   MASS OR HEAT BALANCE        1.0000          *******          *******
      WELL SUMMARY
       TOTAL PRODUCTION         2591.          2.2921E+08       0.0000E+00
       TOTAL INJECTION       0.0000E+00        0.0000E+00       0.0000E+00
      AQUIFER-INFLUENCE FUNCTION
       TOTAL INFLUX (+)        1.0830E-29       9.5842E-25       0.0000E+00
       TOTAL EFFLUX (-)        0.0000E+00       0.0000E+00       0.0000E+00
       CUMULATIVE FLUX           1.0830E-29       9.5842E-25       0.0000E+00
      TOTAL IN PLACE          7.113258E+10     6.290668E+15     0.000000E+00
      INITIAL IN PLACE        7.113258E+10     6.290668E+15     0.000000E+00
      CHANGE IN PLACE            -2590.70      0.000000E+00     0.000000E+00

      MAXIMUM CHANGE AT BLK        ( 1, 1, 1)       ( 50, 1, 1)       ( 50, 1, 1)
       OVER LAST TIME STEP       -1.9838E+04 (PA)    0.0000E+00(DEG.C)   0.0000E+00

      AVERAGE PRESSURE  5.9770E+04 (PA)      HEAT LOSS TO OVER/UNDRBRDN  0.0000E+00 (J)
```

```
                              WELL OPERATION SUMMARY
.......................................................................................................
               PRODUCTION RATES      CUMULATIVE PRODUCTION      CUMULATIVE INJECTION   GRID      PRESSURE    TEMP.
WELL LOCATION  WATER    ENERGY      BRINE    WATER   ENERGY   BRINE   WATER   ENERGY   BRINE  BLOCK   BHP   SURFACE BOT SUR
NO  I J K   (KG/SEC) (J/SEC)    (KG/SEC)  (KG)     (J)     (KG)     (KG)    (J)     (KG)   PRESS     (PA)     (DEG.C)
.......................................................................................................
 1  1  1  1- 1  3.00E+00  2.65E+05  0.00E+00  2.59E+03 2.29E+08 0.00E+00 0.00E+00 0.00E+00 0.00E+00 3.99E+4 5.31E+4 0.00E+0 21.  0.
 2 29  1  1- 1  0.00E+00  0.00E+00  0.00E+00  0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 5.97E+4 5.97E+4 0.00E+0 21.  0.
            .......................................................................
TOTALS - PROD  3.00E+00  2.65E+05  0.00E+00  2.59E+03 2.29E+08 0.00E+00
      - INJ   0.00E+00  0.00E+00  0.00E+00                     0.00E+00 0.00E+00 0.00E+00
```

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

*** ONE-DIMENSIONAL GLOBAL SYSTEM ***

BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC
1	3.9932E+04	21.100	0.0000	2	4.0825E+04	21.100	0.0000	3	4.1719E+04	21.100	0.0000
4	4.2612E+04	21.100	0.0000	5	4.3504E+04	21.100	0.0000	6	4.4396E+04	21.100	0.0000
7	4.5286E+04	21.100	0.0000	8	4.6176E+04	21.100	0.0000	9	4.7063E+04	21.100	0.0000
10	4.7948E+04	21.100	0.0000	11	4.8829E+04	21.100	0.0000	12	4.9706E+04	21.100	0.0000
13	5.0576E+04	21.100	0.0000	14	5.1437E+04	21.100	0.0000	15	5.2287E+04	21.100	0.0000
16	5.3121E+04	21.100	0.0000	17	5.3936E+04	21.100	0.0000	18	5.4726E+04	21.100	0.0000
19	5.5484E+04	21.100	0.0000	20	5.6201E+04	21.100	0.0000	21	5.6870E+04	21.100	0.0000
22	5.7481E+04	21.100	0.0000	23	5.8024E+04	21.100	0.0000	24	5.8493E+04	21.100	0.0000
25	5.8881E+04	21.100	0.0000	26	5.9187E+04	21.100	0.0000	27	5.9414E+04	21.100	0.0000
28	5.9571E+04	21.100	0.0000	29	5.9669E+04	21.100	0.0000	30	5.9725E+04	21.100	0.0000
31	5.9753E+04	21.100	0.0000	32	5.9764E+04	21.100	0.0000	33	5.9768E+04	21.100	0.0000
34	5.9770E+04	21.100	0.0000	35	5.9770E+04	21.100	0.0000	36	5.9770E+04	21.100	0.0000
37	5.9770E+04	21.100	0.0000	38	5.9770E+04	21.100	0.0000	39	5.9770E+04	21.100	0.0000
40	5.9770E+04	21.100	0.0000	41	5.9770E+04	21.100	0.0000	42	5.9770E+04	21.100	0.0000

```
43  5.9770E+04  21.100  0.0000     44  5.9770E+04  21.100  0.0000     45  5.9770E+04  21.100  0.0000
46  5.9770E+04  21.100  0.0000     47  5.9770E+04  21.100  0.0000     48  5.9770E+04  21.100  0.0000
49  5.9770E+04  21.100  0.0000     50  5.9770E+04  21.100  0.0000

                  AQUIFER INFLUX RATES  (POSITIVE-IN : NEGATIVE-OUT)
                  ..............................................

INFLUENCE BLK NO       1
BLOCK (I,J,K)    ( 50,  1,  1)(
FLUID  (KG/SEC)    1.253E-32
```

```
*** RECURRENT DATA SPECIFICATION BEGINNING AT TIME =   864.0    (SECS) ***
-----------------------------------------------------------------------------

                   INPUT CONTROL OPTIONS
     ...................................................
     INDQ IWELL IMETH ITHRU IRSS IPROD IOPT INDT ICLL IRCH ICHCR
     ...................................................
      0   0    0    0     0    0     0    0    0    0    0


               TIME STEPPING AND OUTPUT CONTROL OPTIONS
 ..........................................................................
  TCHG      DT   IO1 IO2 IO3 IO4 IO5 IO6 IO8 RSTWR MAP MDAT IIPRT IO5D IO8D IIPRTD
 ..........................................................................

 8.640E+06 0.000E+00  1   1   0   1  -1   1   0   0   0   0   0   0   0   0

               AUTOMATIC TIME STEP CONTROL DATA

          MAX BRINE CHANGE PER TIME STEP .... DSMX .. 0.250     FRACTION
          MAX PRESSURE CHANGE PER TIME STEP . DPMX .. 6.8940E+04 (PA)
          MAX TEMP. CHANGE PER TIME STEP .... DTPMX .  5.000     (DEG.C)
          MAX TIME STEP ALLOWED ............ DTMAX . 8.6400E+06 (SECS)
          MIN TIME STEP REQUIRED ........... DTMIN . 8.6400E+04 (SECS)


----------------------------------------------------------------------------------------------------


   ELAPSED SIMULATION TIME  8.7264E+04 SECS (  1.010    DAYS   , 2.7671E-03 YEARS )
   ********************************************************************************

 TIME STEP NUMBER    2   NUMBER OF OUTER ITERATIONS   1    CURRENT TIME STEP  8.6400E+04 SECS
```

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

*** ONE-DIMENSIONAL GLOBAL SYSTEM ***

BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC
1	2.9051E+04	21.100	0.0000	2	2.9945E+04	21.100	0.0000	3	3.0839E+04	21.100	0.0000
4	3.1733E+04	21.100	0.0000	5	3.2627E+04	21.100	0.0000	6	3.3521E+04	21.100	0.0000
7	3.4415E+04	21.100	0.0000	8	3.5309E+04	21.100	0.0000	9	3.6203E+04	21.100	0.0000
10	3.7098E+04	21.100	0.0000	11	3.7992E+04	21.100	0.0000	12	3.8885E+04	21.100	0.0000
13	3.9779E+04	21.100	0.0000	14	4.0673E+04	21.100	0.0000	15	4.1567E+04	21.100	0.0000
16	4.2460E+04	21.100	0.0000	17	4.3353E+04	21.100	0.0000	18	4.4246E+04	21.100	0.0000
19	4.5138E+04	21.100	0.0000	20	4.6029E+04	21.100	0.0000	21	4.6919E+04	21.100	0.0000
22	4.7806E+04	21.100	0.0000	23	4.8691E+04	21.100	0.0000	24	4.9572E+04	21.100	0.0000
25	5.0447E+04	21.100	0.0000	26	5.1315E+04	21.100	0.0000	27	5.2171E+04	21.100	0.0000
28	5.3014E+04	21.100	0.0000	29	5.3837E+04	21.100	0.0000	30	5.4635E+04	21.100	0.0000
31	5.5402E+04	21.100	0.0000	32	5.6129E+04	21.100	0.0000	33	5.6807E+04	21.100	0.0000
34	5.7428E+04	21.100	0.0000	35	5.7980E+04	21.100	0.0000	36	5.8458E+04	21.100	0.0000
37	5.8854E+04	21.100	0.0000	38	5.9167E+04	21.100	0.0000	39	5.9401E+04	21.100	0.0000
40	5.9562E+04	21.100	0.0000	41	5.9664E+04	21.100	0.0000	42	5.9722E+04	21.100	0.0000
43	5.9751E+04	21.100	0.0000	44	5.9764E+04	21.100	0.0000	45	5.9768E+04	21.100	0.0000
46	5.9770E+04	21.100	0.0000	47	5.9770E+04	21.100	0.0000	48	5.9770E+04	21.100	0.0000
49	5.9770E+04	21.100	0.0000	50	5.9770E+04	21.100	0.0000				

ELAPSED SIMULATION TIME 2.1686E+05 SECS (2.510 DAYS , 6.8767E-03 YEARS)

TIME STEP NUMBER 3 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 1.2960E+05 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

*** ONE-DIMENSIONAL GLOBAL SYSTEM ***

BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC
1	2.6295E+04	21.100	0.0000	2	2.7189E+04	21.100	0.0000	3	2.8083E+04	21.100	0.0000
4	2.8977E+04	21.100	0.0000	5	2.9871E+04	21.100	0.0000	6	3.0765E+04	21.100	0.0000
7	3.1660E+04	21.100	0.0000	8	3.2554E+04	21.100	0.0000	9	3.3448E+04	21.100	0.0000
10	3.4342E+04	21.100	0.0000	11	3.5236E+04	21.100	0.0000	12	3.6130E+04	21.100	0.0000
13	3.7024E+04	21.100	0.0000	14	3.7918E+04	21.100	0.0000	15	3.8812E+04	21.100	0.0000
16	3.9706E+04	21.100	0.0000	17	4.0600E+04	21.100	0.0000	18	4.1494E+04	21.100	0.0000
19	4.2388E+04	21.100	0.0000	20	4.3281E+04	21.100	0.0000	21	4.4175E+04	21.100	0.0000
22	4.5068E+04	21.100	0.0000	23	4.5960E+04	21.100	0.0000	24	4.6852E+04	21.100	0.0000
25	4.7742E+04	21.100	0.0000	26	4.8631E+04	21.100	0.0000	27	4.9518E+04	21.100	0.0000
28	5.0401E+04	21.100	0.0000	29	5.1278E+04	21.100	0.0000	30	5.2149E+04	21.100	0.0000
31	5.3009E+04	21.100	0.0000	32	5.3855E+04	21.100	0.0000	33	5.4680E+04	21.100	0.0000
34	5.5478E+04	21.100	0.0000	35	5.6238E+04	21.100	0.0000	36	5.6949E+04	21.100	0.0000
37	5.7598E+04	21.100	0.0000	38	5.8171E+04	21.100	0.0000	39	5.8656E+04	21.100	0.0000
40	5.9045E+04	21.100	0.0000	41	5.9336E+04	21.100	0.0000	42	5.9535E+04	21.100	0.0000
43	5.9657E+04	21.100	0.0000	44	5.9723E+04	21.100	0.0000	45	5.9754E+04	21.100	0.0000
46	5.9765E+04	21.100	0.0000	47	5.9769E+04	21.100	0.0000	48	5.9770E+04	21.100	0.0000
49	5.9770E+04	21.100	0.0000	50	5.9770E+04	21.100	0.0000				

ELAPSED SIMULATION TIME 4.1126E+05 SECS (4.760 DAYS , 1.3041E-02 YEARS)
****

TIME STEP NUMBER 4 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 1.9440E+05 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

*** ONE-DIMENSIONAL GLOBAL SYSTEM ***

BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK	PRESSURE	TEMP	BRINE CONC
1	2.4598E+04	21.100	0.0000	2	2.5492E+04	21.100	0.0000	3	2.6386E+04	21.100	0.0000				
4	2.7280E+04	21.100	0.0000	5	2.8174E+04	21.100	0.0000	6	2.9068E+04	21.100	0.0000				
7	2.9963E+04	21.100	0.0000	8	3.0857E+04	21.100	0.0000	9	3.1751E+04	21.100	0.0000				
10	3.2645E+04	21.100	0.0000	11	3.3539E+04	21.100	0.0000	12	3.4433E+04	21.100	0.0000				
13	3.5327E+04	21.100	0.0000	14	3.6221E+04	21.100	0.0000	15	3.7115E+04	21.100	0.0000				
16	3.8010E+04	21.100	0.0000	17	3.8904E+04	21.100	0.0000	18	3.9798E+04	21.100	0.0000				
19	4.0692E+04	21.100	0.0000	20	4.1585E+04	21.100	0.0000	21	4.2479E+04	21.100	0.0000				
22	4.3373E+04	21.100	0.0000	23	4.4266E+04	21.100	0.0000	24	4.5159E+04	21.100	0.0000				
25	4.6052E+04	21.100	0.0000	26	4.6944E+04	21.100	0.0000	27	4.7835E+04	21.100	0.0000				
28	4.8724E+04	21.100	0.0000	29	4.9612E+04	21.100	0.0000	30	5.0496E+04	21.100	0.0000				
31	5.1375E+04	21.100	0.0000	32	5.2248E+04	21.100	0.0000	33	5.3112E+04	21.100	0.0000				
34	5.3961E+04	21.100	0.0000	35	5.4791E+04	21.100	0.0000	36	5.5595E+04	21.100	0.0000				
37	5.6361E+04	21.100	0.0000	38	5.7077E+04	21.100	0.0000	39	5.7728E+04	21.100	0.0000				
40	5.8300E+04	21.100	0.0000	41	5.8777E+04	21.100	0.0000	42	5.9151E+04	21.100	0.0000				
43	5.9420E+04	21.100	0.0000	44	5.9594E+04	21.100	0.0000	45	5.9694E+04	21.100	0.0000				
46	5.9742E+04	21.100	0.0000	47	5.9762E+04	21.100	0.0000	48	5.9768E+04	21.100	0.0000				
49	5.9770E+04	21.100	0.0000	50	5.9770E+04	21.100	0.0000								

ELAPSED SIMULATION TIME 7.0286E+05 SECS (8.135 DAYS , 2.2288E-02 YEARS)
****

TIME STEP NUMBER 5 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 2.9160E+05 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

*** ONE-DIMENSIONAL GLOBAL SYSTEM ***

BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC
1	2.3253E+04	21.100	0.0000	2	2.4147E+04	21.100	0.0000	3	2.5041E+04	21.100	0.0000
4	2.5935E+04	21.100	0.0000	5	2.6830E+04	21.100	0.0000	6	2.7724E+04	21.100	0.0000
7	2.8618E+04	21.100	0.0000	8	2.9512E+04	21.100	0.0000	9	3.0406E+04	21.100	0.0000
10	3.1300E+04	21.100	0.0000	11	3.2194E+04	21.100	0.0000	12	3.3088E+04	21.100	0.0000
13	3.3983E+04	21.100	0.0000	14	3.4877E+04	21.100	0.0000	15	3.5771E+04	21.100	0.0000
16	3.6665E+04	21.100	0.0000	17	3.7559E+04	21.100	0.0000	18	3.8453E+04	21.100	0.0000
19	3.9347E+04	21.100	0.0000	20	4.0241E+04	21.100	0.0000	21	4.1135E+04	21.100	0.0000
22	4.2029E+04	21.100	0.0000	23	4.2923E+04	21.100	0.0000	24	4.3816E+04	21.100	0.0000
25	4.4710E+04	21.100	0.0000	26	4.5603E+04	21.100	0.0000	27	4.6495E+04	21.100	0.0000
28	4.7387E+04	21.100	0.0000	29	4.8277E+04	21.100	0.0000	30	4.9166E+04	21.100	0.0000
31	5.0052E+04	21.100	0.0000	32	5.0935E+04	21.100	0.0000	33	5.1813E+04	21.100	0.0000
34	5.2683E+04	21.100	0.0000	35	5.3542E+04	21.100	0.0000	36	5.4385E+04	21.100	0.0000
37	5.5207E+04	21.100	0.0000	38	5.5997E+04	21.100	0.0000	39	5.6745E+04	21.100	0.0000
40	5.7436E+04	21.100	0.0000	41	5.8055E+04	21.100	0.0000	42	5.8584E+04	21.100	0.0000
43	5.9010E+04	21.100	0.0000	44	5.9327E+04	21.100	0.0000	45	5.9541E+04	21.100	0.0000
46	5.9668E+04	21.100	0.0000	47	5.9731E+04	21.100	0.0000	48	5.9758E+04	21.100	0.0000
49	5.9767E+04	21.100	0.0000	50	5.9770E+04	21.100	0.0000				

ELAPSED SIMULATION TIME 1.1403E+06 SECS (13.20 DAYS , 3.6158E-02 YEARS)

TIME STEP NUMBER 6 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 4.3740E+05 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

*** ONE-DIMENSIONAL GLOBAL SYSTEM ***

BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC
1	2.2072E+04	21.100	0.0000	2	2.2967E+04	21.100	0.0000	3	2.3861E+04	21.100	0.0000
4	2.4755E+04	21.100	0.0000	5	2.5649E+04	21.100	0.0000	6	2.6543E+04	21.100	0.0000
7	2.7437E+04	21.100	0.0000	8	2.8331E+04	21.100	0.0000	9	2.9225E+04	21.100	0.0000
10	3.0120E+04	21.100	0.0000	11	3.1014E+04	21.100	0.0000	12	3.1908E+04	21.100	0.0000
13	3.2802E+04	21.100	0.0000	14	3.3696E+04	21.100	0.0000	15	3.4590E+04	21.100	0.0000
16	3.5484E+04	21.100	0.0000	17	3.6378E+04	21.100	0.0000	18	3.7272E+04	21.100	0.0000
19	3.8167E+04	21.100	0.0000	20	3.9061E+04	21.100	0.0000	21	3.9955E+04	21.100	0.0000
22	4.0849E+04	21.100	0.0000	23	4.1743E+04	21.100	0.0000	24	4.2636E+04	21.100	0.0000
25	4.3530E+04	21.100	0.0000	26	4.4423E+04	21.100	0.0000	27	4.5317E+04	21.100	0.0000
28	4.6209E+04	21.100	0.0000	29	4.7101E+04	21.100	0.0000	30	4.7992E+04	21.100	0.0000
31	4.8882E+04	21.100	0.0000	32	4.9769E+04	21.100	0.0000	33	5.0654E+04	21.100	0.0000
34	5.1533E+04	21.100	0.0000	35	5.2407E+04	21.100	0.0000	36	5.3271E+04	21.100	0.0000
37	5.4121E+04	21.100	0.0000	38	5.4952E+04	21.100	0.0000	39	5.5755E+04	21.100	0.0000
40	5.6521E+04	21.100	0.0000	41	5.7235E+04	21.100	0.0000	42	5.7881E+04	21.100	0.0000

43	5.8443E+04	21.100	0.0000	44	5.8904E+04	21.100	0.0000	45	5.9255E+04	21.100	0.0000
46	5.9497E+04	21.100	0.0000	47	5.9645E+04	21.100	0.0000	48	5.9722E+04	21.100	0.0000
49	5.9755E+04	21.100	0.0000	50	5.9767E+04	21.100	0.0000				

ELAPSED SIMULATION TIME 1.7964E+06 SECS (20.79 DAYS , 5.6962E-02 YEARS)
****

TIME STEP NUMBER 7 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 6.5610E+05 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

*** ONE-DIMENSIONAL GLOBAL SYSTEM ***

BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC
1	2.0981E+04	21.100	0.0000	2	2.1875E+04	21.100	0.0000	3	2.2769E+04	21.100	0.0000
4	2.3663E+04	21.100	0.0000	5	2.4557E+04	21.100	0.0000	6	2.5451E+04	21.100	0.0000
7	2.6345E+04	21.100	0.0000	8	2.7240E+04	21.100	0.0000	9	2.8134E+04	21.100	0.0000
10	2.9028E+04	21.100	0.0000	11	2.9922E+04	21.100	0.0000	12	3.0816E+04	21.100	0.0000
13	3.1710E+04	21.100	0.0000	14	3.2604E+04	21.100	0.0000	15	3.3498E+04	21.100	0.0000
16	3.4393E+04	21.100	0.0000	17	3.5287E+04	21.100	0.0000	18	3.6181E+04	21.100	0.0000
19	3.7075E+04	21.100	0.0000	20	3.7969E+04	21.100	0.0000	21	3.8863E+04	21.100	0.0000
22	3.9757E+04	21.100	0.0000	23	4.0651E+04	21.100	0.0000	24	4.1545E+04	21.100	0.0000
25	4.2439E+04	21.100	0.0000	26	4.3333E+04	21.100	0.0000	27	4.4226E+04	21.100	0.0000
28	4.5119E+04	21.100	0.0000	29	4.6012E+04	21.100	0.0000	30	4.6904E+04	21.100	0.0000
31	4.7796E+04	21.100	0.0000	32	4.8686E+04	21.100	0.0000	33	4.9574E+04	21.100	0.0000

34	5.0459E+04	21.100	0.0000	35	5.1340E+04	21.100	0.0000	36	5.2215E+04	21.100	0.0000
37	5.3082E+04	21.100	0.0000	38	5.3937E+04	21.100	0.0000	39	5.4773E+04	21.100	0.0000
40	5.5585E+04	21.100	0.0000	41	5.6361E+04	21.100	0.0000	42	5.7089E+04	21.100	0.0000
43	5.7754E+04	21.100	0.0000	44	5.8337E+04	21.100	0.0000	45	5.8822E+04	21.100	0.0000
46	5.9198E+04	21.100	0.0000	47	5.9462E+04	21.100	0.0000	48	5.9626E+04	21.100	0.0000
49	5.9714E+04	21.100	0.0000	50	5.9755E+04	21.100	0.0000				

ELAPSED SIMULATION TIME 2.7805E+06 SECS (32.18 DAYS , 8.8170E-02 YEARS)
****

TIME STEP NUMBER 8 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 9.8415E+05 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

*** ONE-DIMENSIONAL GLOBAL SYSTEM ***

BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC
1	1.9941E+04	21.100	0.0000	2	2.0836E+04	21.100	0.0000	3	2.1730E+04	21.100	0.0000
4	2.2624E+04	21.100	0.0000	5	2.3518E+04	21.100	0.0000	6	2.4412E+04	21.100	0.0000
7	2.5306E+04	21.100	0.0000	8	2.6200E+04	21.100	0.0000	9	2.7094E+04	21.100	0.0000
10	2.7989E+04	21.100	0.0000	11	2.8883E+04	21.100	0.0000	12	2.9777E+04	21.100	0.0000
13	3.0671E+04	21.100	0.0000	14	3.1565E+04	21.100	0.0000	15	3.2459E+04	21.100	0.0000
16	3.3353E+04	21.100	0.0000	17	3.4247E+04	21.100	0.0000	18	3.5142E+04	21.100	0.0000
19	3.6036E+04	21.100	0.0000	20	3.6930E+04	21.100	0.0000	21	3.7824E+04	21.100	0.0000
22	3.8718E+04	21.100	0.0000	23	3.9612E+04	21.100	0.0000	24	4.0506E+04	21.100	0.0000

25	4.1400E+04	21.100	0.0000	26	4.2294E+04	21.100	0.0000	27	4.3187E+04	21.100	0.0000
28	4.4081E+04	21.100	0.0000	29	4.4974E+04	21.100	0.0000	30	4.5867E+04	21.100	0.0000
31	4.6760E+04	21.100	0.0000	32	4.7651E+04	21.100	0.0000	33	4.8541E+04	21.100	0.0000
34	4.9430E+04	21.100	0.0000	35	5.0316E+04	21.100	0.0000	36	5.1198E+04	21.100	0.0000
37	5.2074E+04	21.100	0.0000	38	5.2943E+04	21.100	0.0000	39	5.3800E+04	21.100	0.0000
40	5.4641E+04	21.100	0.0000	41	5.5457E+04	21.100	0.0000	42	5.6241E+04	21.100	0.0000
43	5.6979E+04	21.100	0.0000	44	5.7656E+04	21.100	0.0000	45	5.8255E+04	21.100	0.0000
46	5.8758E+04	21.100	0.0000	47	5.9152E+04	21.100	0.0000	48	5.9434E+04	21.100	0.0000
49	5.9613E+04	21.100	0.0000	50	5.9714E+04	21.100	0.0000				

ELAPSED SIMULATION TIME 4.2567E+06 SECS (49.27 DAYS , 0.1350 YEARS)
****

TIME STEP NUMBER 9 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 1.4762E+06 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

*** ONE-DIMENSIONAL GLOBAL SYSTEM ***

BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC
1	1.8935E+04	21.100	0.0000	2	1.9830E+04	21.100	0.0000	3	2.0724E+04	21.100	0.0000
4	2.1618E+04	21.100	0.0000	5	2.2512E+04	21.100	0.0000	6	2.3406E+04	21.100	0.0000
7	2.4300E+04	21.100	0.0000	8	2.5194E+04	21.100	0.0000	9	2.6088E+04	21.100	0.0000
10	2.6983E+04	21.100	0.0000	11	2.7877E+04	21.100	0.0000	12	2.8771E+04	21.100	0.0000
13	2.9665E+04	21.100	0.0000	14	3.0559E+04	21.100	0.0000	15	3.1453E+04	21.100	0.0000

16	3.2347E+04	21.100	0.0000	17	3.3241E+04	21.100	0.0000	18	3.4136E+04	21.100	0.0000
19	3.5030E+04	21.100	0.0000	20	3.5924E+04	21.100	0.0000	21	3.6818E+04	21.100	0.0000
22	3.7712E+04	21.100	0.0000	23	3.8606E+04	21.100	0.0000	24	3.9500E+04	21.100	0.0000
25	4.0394E+04	21.100	0.0000	26	4.1288E+04	21.100	0.0000	27	4.2182E+04	21.100	0.0000
28	4.3076E+04	21.100	0.0000	29	4.3969E+04	21.100	0.0000	30	4.4863E+04	21.100	0.0000
31	4.5756E+04	21.100	0.0000	32	4.6648E+04	21.100	0.0000	33	4.7540E+04	21.100	0.0000
34	4.8430E+04	21.100	0.0000	35	4.9319E+04	21.100	0.0000	36	5.0205E+04	21.100	0.0000
37	5.1088E+04	21.100	0.0000	38	5.1966E+04	21.100	0.0000	39	5.2836E+04	21.100	0.0000
40	5.3695E+04	21.100	0.0000	41	5.4538E+04	21.100	0.0000	42	5.5358E+04	21.100	0.0000
43	5.6148E+04	21.100	0.0000	44	5.6893E+04	21.100	0.0000	45	5.7580E+04	21.100	0.0000
46	5.8191E+04	21.100	0.0000	47	5.8708E+04	21.100	0.0000	48	5.9118E+04	21.100	0.0000
49	5.9415E+04	21.100	0.0000	50	5.9611E+04	21.100	0.0000				

ELAPSED SIMULATION TIME 6.4711E+06 SECS (74.90 DAYS , 0.2052 YEARS)
****

TIME STEP NUMBER 10 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 2.2143E+06 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

*** ONE-DIMENSIONAL GLOBAL SYSTEM ***

BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC
1	1.7953E+04	21.100	0.0000	2	1.8847E+04	21.100	0.0000	3	1.9741E+04	21.100	0.0000
4	2.0635E+04	21.100	0.0000	5	2.1530E+04	21.100	0.0000	6	2.2424E+04	21.100	0.0000

```
 7  2.3318E+04  21.100  0.0000     8  2.4212E+04  21.100  0.0000     9  2.5106E+04  21.100  0.0000
10  2.6000E+04  21.100  0.0000    11  2.6894E+04  21.100  0.0000    12  2.7788E+04  21.100  0.0000
13  2.8683E+04  21.100  0.0000    14  2.9577E+04  21.100  0.0000    15  3.0471E+04  21.100  0.0000
16  3.1365E+04  21.100  0.0000    17  3.2259E+04  21.100  0.0000    18  3.3153E+04  21.100  0.0000
19  3.4047E+04  21.100  0.0000    20  3.4941E+04  21.100  0.0000    21  3.5836E+04  21.100  0.0000
22  3.6730E+04  21.100  0.0000    23  3.7624E+04  21.100  0.0000    24  3.8518E+04  21.100  0.0000
25  3.9412E+04  21.100  0.0000    26  4.0306E+04  21.100  0.0000    27  4.1200E+04  21.100  0.0000
28  4.2094E+04  21.100  0.0000    29  4.2987E+04  21.100  0.0000    30  4.3881E+04  21.100  0.0000
31  4.4774E+04  21.100  0.0000    32  4.5667E+04  21.100  0.0000    33  4.6560E+04  21.100  0.0000
34  4.7452E+04  21.100  0.0000    35  4.8342E+04  21.100  0.0000    36  4.9231E+04  21.100  0.0000
37  5.0118E+04  21.100  0.0000    38  5.1001E+04  21.100  0.0000    39  5.1880E+04  21.100  0.0000
40  5.2751E+04  21.100  0.0000    41  5.3611E+04  21.100  0.0000    42  5.4457E+04  21.100  0.0000
43  5.5281E+04  21.100  0.0000    44  5.6074E+04  21.100  0.0000    45  5.6826E+04  21.100  0.0000
46  5.7521E+04  21.100  0.0000    47  5.8142E+04  21.100  0.0000    48  5.8673E+04  21.100  0.0000
49  5.9098E+04  21.100  0.0000    50  5.9413E+04  21.100  0.0000

--------------------------------------------------------------------------------------------------

    ELAPSED SIMULATION TIME  8.6400E+06 SECS (  100.0    DAYS  , 0.2740    YEARS )
    **************************************************************************************

  TIME STEP NUMBER   11   NUMBER OF OUTER ITERATIONS   1    CURRENT TIME STEP  2.1689E+06 SECS

                          FLUID (KG)      ENERGY (J)      BRINE (KG)
                         ............    ............    ............
(GLOBAL+LOCAL)  MASS OR HEAT BALANCE      1.0000        *******        *******
         WELL SUMMARY
          TOTAL PRODUCTION        2.5907E+07      2.2916E+12      0.0000E+00
          TOTAL INJECTION       0.0000E+00      0.0000E+00      0.0000E+00
         AQUIFER-INFLUENCE FUNCTION
          TOTAL INFLUX (+)      4.5668E+06      4.0414E+11      0.0000E+00
          TOTAL EFFLUX (-)      0.0000E+00      0.0000E+00      0.0000E+00
          CUMULATIVE FLUX         4.5668E+06      4.0414E+11      0.0000E+00
         TOTAL IN PLACE         7.111124E+10    6.288781E+15    0.000000E+00
         INITIAL IN PLACE       7.113258E+10    6.290668E+15    0.000000E+00
         CHANGE IN PLACE         -2.134025E+07    0.000000E+00    0.000000E+00
```

```
MAXIMUM CHANGE AT BLK      ( 1, 1, 1)      ( 50, 1, 1)      ( 50, 1, 1)
 OVER LAST TIME STEP        -699.2   (PA)   0.0000E+00(DEG.C)  0.0000E+00

AVERAGE PRESSURE  5.7971E+04 (PA)      HEAT LOSS TO OVER/UNDRBRDN  0.0000E+00 (J)


                     WELL OPERATION SUMMARY
.............................................................................................
            PRODUCTION RATES      CUMULATIVE PRODUCTION     CUMULATIVE INJECTION   GRID     PRESSURE    TEMP.
WELL LOCATION   WATER   ENERGY    BRINE   WATER   ENERGY   BRINE   WATER   ENERGY   BRINE BLOCK   BHP   SURFACE BOT SUR
NO  I  J  K   (KG/SEC) (J/SEC)   (KG/SEC)  (KG)    (J)     (KG)     (KG)    (J)     (KG)  PRESS    (PA)     (DEG.C)
.............................................................................................
 1  1  1  1- 1  3.00E+00  2.65E+05  0.00E+00  2.59E+07 2.29E+12 0.00E+00 0.00E+00 0.00E+00 0.00E+00 1.73E+4 1.13E+4 0.00E+0 21.  0.
 2 29  1  1- 1  0.00E+00  0.00E+00  0.00E+00  0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 4.23E+4 4.23E+4 0.00E+0 21.  0.
          ..........................................................................
TOTALS - PROD   3.00E+00  2.65E+05  0.00E+00  2.59E+07 2.29E+12 0.00E+00
       - INJ    0.00E+00  0.00E+00  0.00E+00                    0.00E+00 0.00E+00 0.00E+00




               *** GLOBAL (FRACTURE) DEPENDENT VALUES ***
               ------------------------------------------


                *** ONE-DIMENSIONAL GLOBAL SYSTEM ***

.............................................................................................
   BLOCK  PRESSURE   TEMP  BRINE CONC  BLOCK  PRESSURE   TEMP  BRINE CONC  BLOCK  PRESSURE    TEMP  BRINE CONC
    NO.    (PA)    (DEG.C)  FRAC        NO.    (PA)    (DEG.C)  FRAC        NO.    (PA)    (DEG.C)  FRAC
.............................................................................................
     1  1.7254E+04  21.100  0.0000      2  1.8148E+04  21.100  0.0000      3  1.9042E+04  21.100  0.0000
     4  1.9936E+04  21.100  0.0000      5  2.0830E+04  21.100  0.0000      6  2.1725E+04  21.100  0.0000
     7  2.2619E+04  21.100  0.0000      8  2.3513E+04  21.100  0.0000      9  2.4407E+04  21.100  0.0000
    10  2.5301E+04  21.100  0.0000     11  2.6195E+04  21.100  0.0000     12  2.7089E+04  21.100  0.0000
    13  2.7983E+04  21.100  0.0000     14  2.8878E+04  21.100  0.0000     15  2.9772E+04  21.100  0.0000
    16  3.0666E+04  21.100  0.0000     17  3.1560E+04  21.100  0.0000     18  3.2454E+04  21.100  0.0000
    19  3.3348E+04  21.100  0.0000     20  3.4242E+04  21.100  0.0000     21  3.5136E+04  21.100  0.0000
    22  3.6030E+04  21.100  0.0000     23  3.6925E+04  21.100  0.0000     24  3.7819E+04  21.100  0.0000
    25  3.8713E+04  21.100  0.0000     26  3.9607E+04  21.100  0.0000     27  4.0501E+04  21.100  0.0000
```

```
28  4.1395E+04  21.100  0.0000     29  4.2289E+04  21.100  0.0000     30  4.3182E+04  21.100  0.0000
31  4.4076E+04  21.100  0.0000     32  4.4969E+04  21.100  0.0000     33  4.5862E+04  21.100  0.0000
34  4.6755E+04  21.100  0.0000     35  4.7646E+04  21.100  0.0000     36  4.8537E+04  21.100  0.0000
37  4.9425E+04  21.100  0.0000     38  5.0312E+04  21.100  0.0000     39  5.1194E+04  21.100  0.0000
40  5.2071E+04  21.100  0.0000     41  5.2941E+04  21.100  0.0000     42  5.3799E+04  21.100  0.0000
43  5.4642E+04  21.100  0.0000     44  5.5461E+04  21.100  0.0000     45  5.6249E+04  21.100  0.0000
46  5.6992E+04  21.100  0.0000     47  5.7676E+04  21.100  0.0000     48  5.8283E+04  21.100  0.0000
49  5.8796E+04  21.100  0.0000     50  5.9203E+04  21.100  0.0000

                    AQUIFER INFLUX RATES  (POSITIVE-IN : NEGATIVE-OUT)
                    ..............................................

INFLUENCE BLK NO      1
BLOCK (I,J,K)    ( 50,  1,  1)(
FLUID  (KG/SEC)   9.996E-01


==================================================================================================

                  NORMAL TERMINATION  (ITIME =   11 ; TIME = 8.6400E+06 )
                       CPU elapsed time =  5.824     seconds
```

```
PROB.  2.0 (MR) ++ FLOW VERIFICATION - SI (METRIC) - RADIAL COORDS
FULLY PENETRATING WELL IN A LEAKY AQUIFER W/ STORAGE (HANTUSH, 1960) SHORT TIME
  1  0  0  0  0  0  0  1  0  0000                              M-2
 50  1  2  3  0  1  0  1  0  2  0  0  0  0                      M-3-1
  0  0  0  0                                                    M-3-2
0.      7.67E-07 0.     1.      1.                              R1-1
1.      1.      1.      1.      1.      1.      1.              R1-2
1922.     6.00E+04 21.1    1000.   1000.                        R1-3
  0  0  0  2                                                    R1-6
21.1    .001    21.1    .001                                    R1-7
0.      21.1                                                    R1-11
10.     21.1                                                    R1-11
  0  0                                                          R1-12
21.1      6.00E+04 1.674   0.                                   R1-16
.1143   .2957   6096.   0.                                      R1-22
.30      3.00E-25 3.00E-10 .40    0.0  3.048     3.281E-04
3.281E-04 .004374  0.0                                          R1-23
000000                                                          R1-26-BLNK
  3  1                                                          R1-27
  2  0  1                                                       R1-29
.001    .0133   6096.   360.                                    R1-31
000000                                                          R1-33-BLNK
  0  0  0                                                       I-1
0.                                                              R1A-1
  1  1  0  0  0  0  0  0  0  0 0                                R2-1
  3                                                             R2-4
.014    0.      0.                                              R2-5
  1  1  1  2  2  1                                              R2-7-1
 4.4076E-3 1.00E10  21.1   0.                                   R2-7-2
  2  22  1  2  2  1                                             R2-7-1
 1.00E+10 1.00E10  21.1   0.                                    R2-7-2
  3  30  1  2  2  1                                             R2-7-1
 1.00E 10  1.00E 10  21.1   0.                                  R2-7-2
000000                                                          R2-7-BLNK
8.64     8.64  000000
  1  1  0  -1  -1  -1 0  00    0  0000                          R2-13
  0  0  0  0  0  0  0  0  0  0 0                                R2-1
1800.   0.  0.  0.  68940.  0. 1800.    17.28
  1  1  0  -1  -1  1 0  00     0  0000                          R2-13
  0  0  0  1  0  0  0  0  0  0 0                                R2-1-STOP
  2  OBSERVATION WELL (R=65.61 FT OR 20.0 M)                    P-2
```

```
0.      2000.   40.     0.      60000.  0.      0.                  P-3-1
0.      0.      0.      0.      0   0 0                             P-3-2
86.4    4.233E04 0 0 0 0                                            P-4
172.8   3.582E04 0 0 0 0                                            P-4
432.    2.702E04 0 0  0 0                                           P-4
604.8   2.381E04 0 0 0 0                                            P-4
864.    2.044E04 0 0 0 0                                            P-4
1728.   1.405E04 0 0 0 0                                            P-4
-100.       0 0 0 0 0                                               P-END
  3   OBSERVATION WELL (R=328 FT = 100 M)                           P-2
0.      2000.   40.     0.      60000.  0.      0.                  P-3-1
0.      0.      0.      0.  0 0 0                                   P-3-2
86.4    5.986E+04 0 0 0 0                                           P-4
172.8   5.900E+04 0 0 0 0                                           P-4
432.    5.565E+04 0 0 0 0                                           P-4
604.8   5.397E+04 0 0 0 0                                           P-4
864.    5.155E+04 0 0 0 0                                           P-4
1728.   4.665E+04 0 0 0 0                                           P-4
-100.  0 0 0 0 0                                                    P-END
                                                                    P-STOP

NOTE: WELL INDEX = 2(PI)(.001)/LN(.475/.114)=4.408E-3
```

```
**************************************************
*                                                *
*   >>> S W I F T / 4 8 6 <<<                    *
*                                                *
**************************************************
*                                                *
*        SANDIA Waste-Isolation                  *
*        Flow and Transport in                   *
*      Porous and/or Fractured Media             *
*                                                *
*     Quality Assurance Version 2.53             *
*                                                *
*       --- Transport Equations ---              *
* Fluid free-water surface (steady or transient) *
*     Energy-temperature (transient)             *
*  Dominant specie-brine (steady or transient)   *
*   Trace species-radionuclides (transient)      *
*                                                *
*        --- Code evolution ---                  *
*    Intera Technologies, Inc. 1975-1982         *
*        GeoTrans, Inc. 1982-1993                *
*                                                *
*      Copyright GeoTrans, Inc. 1993             *
*                                                *
**************************************************
```

This page is Blank.

```
                    *** TITLE CARDS ***
                    ------------------

*******************************************************************************
*                                                                             *
* PROB. 2.0 (MR) ++ FLOW VERIFICATION - SI (METRIC) - RADIAL COORDS           *
*                                                                             *
* FULLY PENETRATING WELL IN A LEAKY AQUIFER W/ STORAGE (HANTUSH, 1960)
* SHORT TIME                                                                  *
*                                                                             *
*******************************************************************************


              *** INTEGER CONTROL SPECIFICATION ***
              -------------------------------------


              *** EXECUTION CONTROL OPTIONS ***
            EQUATIONS SOLVING INDEX ............. NCALL.  1
            RESTART RECORD NUMBER ............... RSTST..000E+00
            WELLBORE DATA KEY ................... ISURF.  0
            FREE WATER SURFACE OPTION ........... IFREE.  0
            PLOTTING KEYS - PRESSURE ............ NPLP .  0
                        - TEMPERATURE ......... NPLT .  0
                        - CONCENTRATION ....... NPLC .  0
            UNITS ARE IN (0=ENGLISH, 1=METRIC) .. IUNIT.  1
            NUCLIDE MONITOR (UNIT9) OPTION ...... LBIO .  0
            MAP[ij] {j: 0=NO,1=ASCII,2=BINARY) .. LMAPIT  0
                 {i: 0=Datum, 1=Envr H, 2=Fresh Wat H}
            MASS BALANCE AUXILIARY FILE (UNIT17). LMBAL   0
            AQUIFER INFLUENCE FUNC FILE (UNIT18). LAIF .  0
            PRINT REQUENCY FOR L2SOR ............ L2SORP  5

              *** PROBLEM DIMENSIONS ***
            NUMBER OF BLOCKS IN X-DIRECTION ..... NX ...  50
            NUMBER OF BLOCKS IN Y-DIRECTION ..... NY ...  1
```

```
NUMBER OF BLOCKS IN Z-DIRECTION ..... NZ ...  2
INDEX OF RESERVOIR HETEROGENEITY .... HTG ..  3
NO OF RADIOACTIVE COMPONENTS ........ NCP ..  0
NUMBER OF ROCK TYPES ................ NRT ..  1
OUTPUT CONTROL INDEX ................ KOUT .  0
PRINT CONTROL KEY ................... PRT ..  2
MAX NO OF RADIOACTIVE SOURCE BLOCKS . NSMAX   0
MAX NO OF AQUIFER INFL FN BLOCKS .... NABLMX  2
MAX NO OF SURFACE RECHARGE BLOCKS ... NRCHMX  0
METHOD OF SOLUTION .................. METHOD  0


  *** WASTE INVENTORY TABLE ENTRIES ***
NUMBER OF INTERPOLATION TIMES ....... NTIME   0
REPOSITORY AREAL HEATING CONTROL .... KHEAT   0
NUMBER OF REPOSITORY BLOCKS ......... NREPB   0

  *** LOCAL (MATRIX) SUBSYSTEM CONTROL ***
SOLUTION CONTROL .................... KSLVD   0
NUMBER OF LOCAL ROCK TYPES .......... NRTD .  0
OUTPUT CONTROL KEY .................. KOUTD   0


 ***  UTILIZATION OF COMMON ARRAY STORAGE  ***
 --------------------------------------------

               ...........................................................
               .              .                    .       .
               .  BLANK COMMON  .           LABELLED COMMON          .      .
               .-------------------.-----------------------------------------.
               .  REAL  INTEGER  .           REAL          INTEGER  .      .
               .  ------- -------  .  ---------------------------  ---------.  .
               .              .    G       G2      G3      IG   .  TOTAL  .
               .              .  -------  -------  -------  -------  .  ------- .
               .              .                    .       .
CODE DIMENSIONS : .  16403   4469  .  105000   85000  140000   35000  .  365000 .
               .              .                    .       .
DATA REQUIREMENTS: .  16403   4469  .    8896    2407    3101    1048  .   15452 .
               .              .                    .       .
```

```
..............................................................................

 *** GLOBAL (FRACTURE) AND FLUID DATA ***
WATER COMPRESSIBILITY .............. CW ....  0.00000E+00  (1/PA)
ROCK COMPRESSIBILITY ............... CR ....  7.67000E-07  (1/PA)
WATER THERMAL EXPANSION FACTOR ..... CTW ...  0.00000E+00  (1/DEG.C)
WATER HEAT CAPACITY ................ CPW ...  1.00000E+00  (J/KG-DEG.C)
ROCK HEAT CAPACITY ................. CPR ...  1.00000E+00  (J/CU.M-DEG.C)
MEDIUM THERMAL COND. IN X-DIR ...... UKTX ..  1.00000E+00  (J/M-SEC-DEG.C)
MEDIUM THERMAL COND. IN Y-DIR ...... UKTY ..  1.00000E+00  (J/M-SEC-DEG.C)
MEDIUM THERMAL COND. IN Z-DIR ...... UKTZ ..  1.00000E+00  (J/M-SEC-DEG.C)
LONGITUDINAL DISPERSIVITY FACTOR ... ALPHL..  1.00000E+00  (M)
TRANSVERSE DISPERSIVITY FACTOR ..... ALPHT..  1.00000E+00  (M)
EFFECTIVE MOLECULAR DIFFUSION ...... DMEFF..  1.00000E+00  (SQ.M/SEC)
ROCK DENSITY (SOLID PARTICLE) ...... BROCK..  1.92200E+03  (KG/CU.M)
REF. PRESSURE FOR FLUID DENSITIES .. PBWR ..  6.00000E+04  (PA)
REF. TEMP. FOR FLUID DENSITIES ..... TBWR ..  2.11000E+01  (DEG.C)
FLUID DENSITY (AT C=0.0) ........... BWRN ..  1.00000E+03  (KG/CU.M)
BRINE FLUID DENSITY (AT C=1.0) ..... BWRI ..  1.00000E+03  (KG/CU.M)
```

TEMPERATURE-VISCOSITY TABLE

TEMPERATURE (DEG.C)	VISCOSITY (PA-SEC)
AQUIFER FLUID (AT C=0.0)	
2.11000E+01	1.00000E-03
SATURATED BRINE (AT C=1.0)	
2.11000E+01	1.00000E-03

DEPTH-TEMPERATURE INITIALIZATION

DEPTH (M)	TEMPERATURE (DEG.C)
0.0000E+00	21.10
10.00	21.10

```
*** REFERENCE CONDITIONS FOR FLUID AND GLOBAL SYSTEM ***
REFERENCE FLUID TEMPERATURE ........ TO .... 2.11000E+01 (DEG.C)
INITIAL AND REFERENCE PRESSURE ..... PINIT   6.00000E+04 (PA)
REFERENCE DEPTH OF INITIAL P & T ... HINIT . 1.67400E+00 (M)
DEPTH FROM REF. PLANE TO DATUM ..... HDATUM  0.00000E+00 (M)
REFERENCE WATER DENSITY (AT C=0.0) . BW0 ... 1.00000E+03 (KG/CU.M)
REFERENCE WATER INTERNAL ENERGY .... UW0 ... 8.84358E+04 (J/KG)
REFERENCE WATER ENTHALPY ........... ETH ... 8.84958E+04 (J/KG)
```

*** CYLINDRICAL GLOBAL SYSTEM DATA ***
WELLBORE RADIUS .... RW .... 0.1143 (M)
RADIUS TO CENTER OF FIRST COLUMN ... R1 .... 0.2957 (M)
RESERVOIR EXTERIOR RADIUS .... RE .... 6096. (M)
DEPTH TO CENTROID OF BLOCK (1,1,1) . DEPTH . 0.0000E+00 (M)

LAYERED DESCRIPTION

LYR NO.	THICKNESS (M)	KHORZ (M/SEC)	KVERT (M/SEC)	POROSITY FRACTION	ROCK HEAT CAP (J/CU.M-DEG.C)
1	0.300	3.000E-25	3.000E-10	0.400	0.000E+00
2	3.05	3.281E-04	3.281E-04	0.004	0.000E+00

RADIAL GRID BLOCK DATA

BLOCK NO.	RADII - (M) CENTER	BOUNDARY
1	0.2957	0.1143
2	0.3614	0.3275
3	0.4417	0.4002
4	0.5399	0.4891
5	0.6598	0.5978
6	0.8064	0.7307
7	0.9856	0.8930
8	1.205	1.091
9	1.472	1.334
10	1.799	1.630
11	2.199	1.993

12	2.688	2.435
13	3.285	2.976
14	4.015	3.638
15	4.907	4.446
16	5.997	5.434
17	7.330	6.641
18	8.959	8.117
19	10.95	9.921
20	13.38	12.13
21	16.36	14.82
22	19.99	18.11
23	24.43	22.14
24	29.86	27.05
25	36.49	33.07
26	44.60	40.41
27	54.51	49.39
28	66.63	60.37
29	81.43	73.78
30	99.52	90.18
31	121.6	110.2
32	148.7	134.7
33	181.7	164.6
34	222.1	201.2
35	271.4	245.9
36	331.7	300.6
37	405.4	367.3
38	495.5	449.0
39	605.6	548.7
40	740.2	670.7
41	904.6	819.7
42	1106.	1002.
43	1351.	1224.
44	1652.	1496.
45	2019.	1829.
46	2467.	2235.
47	3015.	2732.
48	3685.	3339.
49	4504.	4081.
50	5505.	4988.

DATA FOR CARTER-TRACY WATER INFLUX CALCULATIONS

KH (SQ.M/SEC)	PHIH (M)	AQUIFER RADIUS RAQ (M)	ANGLE THETA (DEGREES)
1.0000E-03	1.3300E-02	6096.	360.0

CARTESIAN GRID ALLOCATION ASSUMES A CONSTANT
BLOCK THICKNESS. TO ADJUST FOR THIS, ENTER R1-31 INPUT

CARTER-TRACY INFLUENCE FUNCTION

DIMENSIONLESS TIME TD	DIMENSIONLESS PRESSURE P(TD)	ACTUAL TIME (SECS)
1.000E-02	0.112	3.718E+04
5.000E-02	0.229	1.859E+05
1.000E-01	0.315	3.718E+05
0.150	0.376	5.577E+05
0.200	0.424	7.435E+05
0.300	0.503	1.115E+06
0.500	0.616	1.859E+06
0.700	0.702	2.602E+06
1.00	0.802	3.718E+06
1.50	0.927	5.577E+06
2.00	1.02	7.435E+06
3.00	1.17	1.115E+07
5.00	1.36	1.859E+07
7.00	1.50	2.602E+07
10.0	1.65	3.718E+07
15.0	1.83	5.577E+07
20.0	1.96	7.435E+07

30.0	2.15	1.115E+08
40.0	2.28	1.487E+08
50.0	2.39	1.859E+08
60.0	2.48	2.231E+08
70.0	2.55	2.602E+08
80.0	2.62	2.974E+08
90.0	2.67	3.346E+08
100.	2.72	3.718E+08
200.	3.06	7.435E+08
300.	3.26	1.115E+09
500.	3.52	1.859E+09
700.	3.68	2.602E+09
1.000E+03	3.86	3.718E+09

AQUIFER COEFFICIENTS (DIMENSIONLESS)

....

	1	2	3	4	5	6	7	8	9	10
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

	11	12	13	14	15	16	17	18	19	20
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

	21	22	23	24	25	26	27	28	29	30
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

	31	32	33	34	35	36	37	38	39	40
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

	41	42	43	44	45	46	47	48	49	50
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	8.96057E-02
2	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.91039

AQUIFER-INFLUENCE FUNCTION BLOCK NUMBERS
....

	1	2	3	4	5	6	7	8	9	10
1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0

	11	12	13	14	15	16	17	18	19	20
1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0

	21	22	23	24	25	26	27	28	29	30
1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0

	31	32	33	34	35	36	37	38	39	40
1	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0

	41	42	43	44	45	46	47	48	49	50
1	0	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	0	2

This page is Blank.

DEPTH OF BLOCK CENTERS BELOW REFERENCE PLANE (M)
(Measured positive downwards)

All values for this array equal 1.674

*** SALT DISSOLUTION ***

(PRODUCT OF DISSOLUTION RATE AND SOLUBLE FRACTION)

ROCK TYPE	PRODUCT (1/SEC)
1	0.0000E+00

GLOBAL PORE VOLUME (M**3)

	1	2	3	4	5	6	7	8	9	10
1	3.54981E-02	1.99595E-02	2.98148E-02	4.45361E-02	6.65264E-02	9.93746E-02	0.14844	0.22174	0.33122	0.49477
2	3.94383E-03	2.21749E-03	3.31241E-03	4.94795E-03	7.39106E-03	1.10405E-02	1.64919E-02	2.46349E-02	3.67987E-02	5.49685E-02

	11	12	13	14	15	16	17	18	19	20
1	0.73907	1.1040	1.6491	2.4634	3.6797	5.4965	8.2105	12.265	18.320	27.366
2	8.21098E-02	0.12265	0.18321	0.27368	0.40881	0.61066	0.91219	1.3626	2.0354	3.0404

	21	22	23	24	25	26	27	28	29	30
1	40.879	61.063	91.214	136.25	203.53	304.02	454.14	678.37	1013.3	1513.7
2	4.5416	6.7841	10.134	15.137	22.612	33.777	50.454	75.367	112.58	168.17

	31	32	33	34	35	36	37	38	39	40
1	2261.1	3377.5	5045.1	7536.3	11257.	16816.	25119.	37522.	56048.	83723.
2	251.20	375.24	560.51	837.27	1250.7	1868.2	2790.7	4168.6	6226.9	9301.6

	41	42	43	44	45	46	47	48	49	50
1	1.25062E+05	1.86813E+05	2.79054E+05	4.16840E+05	6.22660E+05	9.30106E+05	1.38936E+06	2.07537E+06	3.10011E+06	4.63082E+06
2	13894.	20755.	31003.	46311.	69177.	1.03334E+05	1.54357E+05	2.30573E+05	3.44421E+05	5.14483E+05

GLOBAL ROCK TYPES
....

All values for this array equal 1

GLOBAL X-DIRECTION TRANSMISSIVITY (SQ.M/SEC)
....

All values for this array equal 3.1316E-02

GLOBAL Z-DIRECTION TRANSMISSIVITY (SQ.M/SEC)
....

```
      1          2          3          4          5          6          7          8          9          10

1 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00
2 5.91630E-10 3.32655E-10 4.96908E-10 7.42262E-10 1.10876E-09 1.65623E-09 2.47401E-09 3.69558E-09 5.52032E-09 8.24605E-09

      11         12         13         14         15         16         17         18         19         20

1 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00
2 1.23176E-08 1.83996E-08 2.74847E-08 4.10555E-08 6.13272E-08 9.16082E-08 1.36841E-07 2.04408E-07 3.05337E-07 4.56100E-07

      21         22         23         24         25         26         27         28         29         30
```

1 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00
2 6.81305E-07 1.01771E-06 1.52021E-06 2.27084E-06 3.39209E-06 5.06698E-06 7.56886E-06 1.13061E-05 1.68886E-05 2.52275E-05

31 32 33 34 35 36 37 38 39 40

1 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00
2 3.76839E-05 5.62908E-05 8.40850E-05 1.25603E-04 1.87621E-04 2.80261E-04 4.18644E-04 6.25354E-04 9.34130E-04 1.39537E-03

41 42 43 44 45 46 47 48 49 50

1 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00
2 2.08435E-03 3.11352E-03 4.65086E-03 6.94728E-03 1.03776E-02 1.55016E-02 2.31557E-02 3.45892E-02 5.16680E-02 7.71797E-02

GRID BLOCK CENTER ELEVATION ABOVE DATUM PLANE (M)
(Measured positive upwards)
....

All values for this array equal -1.674

GRID BLOCK THICKNESS (M)
....

All values for this array equal 3.048

INITIAL GLOBAL PRESSURE AT ELEVATION H (PA)
....

All values for this array equal 6.0000E+04

INITIAL GLOBAL PRESSURE AT DATUM ELEVATION (PA)
....

All values for this array equal 4.3583E+04

INITIAL GLOBAL TEMPERATURES (DEG.C)
....

All values for this array equal 21.10

INITIAL GLOBAL BRINE CONCENTRATIONS (FRACTION)
....

All values for this array equal 0.0000E+00

```
*** STATE VARIABLE INITIALIZATION ***
-------------------------------------


      AMOUNT IN-PLACE
      ...............
    WATER  1.53895E+10 (KG)
   ENERGY  1.36098E+15 (J)
    BRINE  0.00000E+00 (KG)
```

```
*** RECURRENT DATA SPECIFICATION BEGINNING AT TIME =  0.0000E+00 (SECS) ***
-------------------------------------------------------------------------

               INPUT CONTROL OPTIONS
 ...................................................................
 INDQ IWELL IMETH ITHRU IRSS IPROD IOPT INDT ICLL IRCH ICHCR
 ...................................................................
  1   1   0   0   0   0   0   0   0   0   0


              METHOD = 1       WT FACTOR =  1.0


 NOTE: FOR DIRECT D4 SOLUTION, THE A-ARRAY (G3)IN LABELLED COMMON GAMMA
    IS DIMENSIONED AT  140000 WORDS  BUT REQUIRES ONLY   3101 WORDS



               *** WELL SPECIFICATION ***
               -------------------------


              TOTAL NUMBER OF WELLS =   3


                 WELL RATES (CU. M/SEC)
         (POSITIVE-PRODUCTION-OUT  :  NEGATIVE-INJECTION-IN)
 ..........................................................................


    1         2         3
1.400E-02 0.000E+00 0.000E+00


                    WELL DATA
  ..................................................................
```

```
WELL        PERFS  SPEC   WI          BHP        TINJ     CINJ
NO  I  J  K1  K2  OPTN  (SQ.M/SEC)   (PA)      (DEG.C)   FRAC.
.........................................................................
 1   1  1   2   2   1   4.408E-03  1.000E+10   21.1     0.000
 2  22  1   2   2   1   1.000E+10  1.000E+10   21.1     0.000
 3  30  1   2   2   1   1.000E+10  1.000E+10   21.1     0.000


LAYER ALLOCATION FACTORS (SCALED IN PROPORTION TO LAYER KH AND SKIN)
.................................................................
WELL  KH (K=IC1)KH (K=IC1+1)   ---    ---
.................................................................

 1  1.000
 2  1.000
 3  1.000


              TIME STEPPING AND OUTPUT CONTROL OPTIONS
..................................................................................
 TCHG      DT   IO1  IO2  IO3  IO4  IO5  IO6  IO8  RSTWR  MAP  MDAT  IIPRT  IO5D  IO8D  IIPRTD
..................................................................................

8.640E+00 8.640E+00   1   1   0  -1  -1  -1   0   0   0   0   0   0   0   0


------------------------------------------------------------------------------------------


 ELAPSED SIMULATION TIME  8.640    SECS  ( 1.0000E-04 DAYS   , 2.7397E-07 YEARS )
*************************************************************************************

TIME STEP NUMBER    1   NUMBER OF OUTER ITERATIONS   1   CURRENT TIME STEP  8.640   SECS


                FLUID (KG)     ENERGY (J)     BRINE (KG)
               ...........    ...........    ...........
```

```
(GLOBAL+LOCAL)  MASS OR HEAT BALANCE        1.0000        *******       *******
       WELL SUMMARY
        TOTAL PRODUCTION          121.0          1.0695E+07     0.0000E+00
        TOTAL INJECTION         0.0000E+00       0.0000E+00     0.0000E+00
       AQUIFER-INFLUENCE FUNCTION
        TOTAL INFLUX (+)        1.1764E-17       1.0408E-12     0.0000E+00
        TOTAL EFFLUX (-)        1.0679E-15       9.4507E-11     0.0000E+00
        CUMULATIVE FLUX        -1.0562E-15      -9.3467E-11     0.0000E+00
       TOTAL IN PLACE           1.538952E+10     1.360984E+15   0.000000E+00
       INITIAL IN PLACE         1.538952E+10     1.360984E+15   0.000000E+00
       CHANGE IN PLACE          -120.960         0.000000E+00   0.000000E+00

       MAXIMUM CHANGE AT BLK      ( 1, 1, 2)      ( 50, 1, 2)      ( 50, 1, 2)
        OVER LAST TIME STEP     -7.7820E+04 (PA)   0.0000E+00(DEG.C)   0.0000E+00

       AVERAGE PRESSURE  4.3583E+04 (PA)      HEAT LOSS TO OVER/UNDRBRDN  0.0000E+00 (J)


                              WELL OPERATION SUMMARY
.....................................................................................................
            PRODUCTION RATES      CUMULATIVE PRODUCTION      CUMULATIVE INJECTION   GRID     PRESSURE    TEMP.
WELL LOCATION  WATER  ENERGY    BRINE   WATER   ENERGY   BRINE  WATER  ENERGY   BRINE BLOCK   BHP  SURFACE BOT SUR
NO  I J K  (KG/SEC) (J/SEC)   (KG/SEC)  (KG)    (J)     (KG)    (KG)    (J)    (KG)  PRESS    (PA)     (DEG.C)
.....................................................................................................
 1  1  1  2- 2 1.40E+01 1.24E+06 0.00E+00 1.21E+02 1.07E+07 0.00E+00 0.00E+00 0.00E+00 0.00E+00-1.78E+4 2.88E+4 0.00E+0 21.  0.
 2 22  1  2- 2 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 5.80E+4 5.80E+4 0.00E+0 21.  0.
 3 30  1  2- 2 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 6.00E+4 6.00E+4 0.00E+0 21.  0.
          ..................................................................
TOTALS - PROD  1.40E+01  1.24E+06  0.00E+00  1.21E+02 1.07E+07 0.00E+00
     - INJ   0.00E+00  0.00E+00  0.00E+00                  0.00E+00 0.00E+00 0.00E+00


                     *** GLOBAL (FRACTURE) DEPENDENT VALUES ***
                     -----------------------------------------


                        GLOBAL PRESSURE AT ELEVATION (PA)
                        .................................
```

	1	2	3	4	5	6	7	8	9	10
1	43582.	43582.	43582.	43582.	43582.	43582.	43582.	43582.	43582.	43582.
2	-17820.	-13444.	-9073.1	-4708.2	-352.26	3991.3	8317.7	12620.	16891.	21117.

	11	12	13	14	15	16	17	18	19	20
1	43582.	43582.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	25283.	29371.	33354.	37201.	40875.	44331.	47521.	50395.	52905.	55013.

	21	22	23	24	25	26	27	28	29	30
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	56700.	57970.	58857.	59421.	59742.	59902.	59969.	59992.	59998.	60000.

	31	32	33	34	35	36	37	38	39	40
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.

GLOBAL PRESSURE AT DATUM (PA)

....

	1	2	3	4	5	6	7	8	9	10
1	43582.	43582.	43582.	43582.	43582.	43582.	43582.	43582.	43582.	43582.
2	-34237.	-29861.	-25490.	-21125.	-16769.	-12426.	-8099.3	-3796.6	473.61	4699.7

	11	12	13	14	15	16	17	18	19	20
1	43582.	43582.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	8866.4	12954.	16937.	20784.	24458.	27914.	31104.	33978.	36488.	38596.

	21	22	23	24	25	26	27	28	29	30
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	40283.	41553.	42440.	43004.	43326.	43485.	43552.	43575.	43581.	43583.

	31	32	33	34	35	36	37	38	39	40
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.

GLOBAL TEMPERATURE (DEG.C)

All values for this array equal 21.10

```
*** RECURRENT DATA SPECIFICATION BEGINNING AT TIME =   8.640    (SECS) ***
--------------------------------------------------------------------------

                    INPUT CONTROL OPTIONS
   ..................................................
   INDQ IWELL  IMETH  ITHRU  IRSS IPROD  IOPT  INDT  ICLL  IRCH  ICHCR
   ..................................................
    0    0     0     0     0    0     0     0    0     0    0


               TIME STEPPING AND OUTPUT CONTROL OPTIONS
..........................................................................
  TCHG      DT   IO1  IO2  IO3  IO4  IO5  IO6  IO8  RSTWR  MAP  MDAT  IIPRT  IO5D  IO8D  IIPRTD
..........................................................................

1.800E+03 0.000E+00   1    1    0   -1   -1    1    0     0     0     0     0     0     0     0

               AUTOMATIC TIME STEP CONTROL DATA

            MAX BRINE CHANGE PER TIME STEP .... DSMX .. 0.250     FRACTION
            MAX PRESSURE CHANGE PER TIME STEP . DPMX .. 6.8940E+04 (PA)
            MAX TEMP. CHANGE PER TIME STEP .... DTPMX .  5.000     (DEG.C)
            MAX TIME STEP ALLOWED ............ DTMAX .  1800.     (SECS)
            MIN TIME STEP REQUIRED ........... DTMIN .  17.28     (SECS)


------------------------------------------------------------------------------------------------


  ELAPSED SIMULATION TIME   25.92    SECS  (  3.0000E-04 DAYS   , 8.2192E-07 YEARS )
 *****************************************************************************

TIME STEP NUMBER    2    NUMBER OF OUTER ITERATIONS   1    CURRENT TIME STEP   17.28    SECS
```

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

GLOBAL PRESSURE AT ELEVATION (PA)

	1	2	3	4	5	6	7	8	9	10
1	43578.	43578.	43579.	43579.	43579.	43579.	43580.	43580.	43580.	43580.
2	-32904.	-28521.	-24138.	-19755.	-15374.	-10994.	-6617.0	-2243.0	2125.9	6487.2

	11	12	13	14	15	16	17	18	19	20
1	43581.	43581.	43581.	43581.	43581.	43582.	43582.	43582.	43582.	43582.
2	10837.	15171.	19480.	23754.	27977.	32127.	36172.	40074.	43780.	47228.

	21	22	23	24	25	26	27	28	29	30
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	50347.	53064.	55319.	57075.	58337.	59158.	59629.	59862.	59958.	59990.

	31	32	33	34	35	36	37	38	39	40
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	59998.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.

GLOBAL PRESSURE AT DATUM (PA)

	1	2	3	4	5	6	7	8	9	10
1	43578.	43578.	43579.	43579.	43579.	43579.	43580.	43580.	43580.	43580.
2	-49321.	-44938.	-40555.	-36172.	-31791.	-27411.	-23034.	-18660.	-14291.	-9929.7

	11	12	13	14	15	16	17	18	19	20
1	43581.	43581.	43581.	43581.	43581.	43582.	43582.	43582.	43582.	43582.
2	-5579.6	-1246.0	3063.4	7337.4	11560.	15710.	19756.	23657.	27363.	30811.

	21	22	23	24	25	26	27	28	29	30
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	33930.	36648.	38902.	40658.	41921.	42741.	43212.	43445.	43541.	43573.

	31	32	33	34	35	36	37	38	39	40
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	43581.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.

GLOBAL TEMPERATURE (DEG.C)
....

All values for this array equal 21.10

ELAPSED SIMULATION TIME 51.84 SECS (6.0000E-04 DAYS , 1.6438E-06 YEARS)
****

TIME STEP NUMBER 3 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 25.92 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

GLOBAL PRESSURE AT ELEVATION (PA)

	1	2	3	4	5	6	7	8	9	10
1	43572.	43573.	43573.	43574.	43574.	43575.	43575.	43576.	43576.	43577.
2	-41469.	-37085.	-32701.	-28317.	-23934.	-19552.	-15170.	-10790.	-6411.3	-2035.8

	11	12	13	14	15	16	17	18	19	20
1	43577.	43578.	43578.	43579.	43579.	43580.	43580.	43581.	43581.	43581.
2	2335.3	6699.9	11055.	15396.	19715.	24003.	28245.	32420.	36497.	40438.

	21	22	23	24	25	26	27	28	29	30
1	43582.	43582.	43582.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	44186.	47676.	50825.	53553.	55786.	57484.	58657.	59375.	59754.	59921.

	31	32	33	34	35	36	37	38	39	40
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	59980.	59996.	59999.	60000.	60000.	60000.	60000.	60000.	60000.	60000.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.

GLOBAL PRESSURE AT DATUM (PA)

	1	2	3	4	5	6	7	8	9	10
1	43572.	43573.	43573.	43574.	43574.	43575.	43575.	43576.	43576.	43577.
2	-57886.	-53502.	-49118.	-44734.	-40351.	-35969.	-31587.	-27207.	-22828.	-18453.

	11	12	13	14	15	16	17	18	19	20
1	43577.	43578.	43578.	43579.	43579.	43580.	43580.	43581.	43581.	43581.
2	-14082.	-9717.0	-5362.0	-1021.4	3298.0	7585.9	11828.	16003.	20080.	24021.

	21	22	23	24	25	26	27	28	29	30
1	43582.	43582.	43582.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	27770.	31259.	34409.	37136.	39369.	41067.	42240.	42959.	43337.	43504.

	31	32	33	34	35	36	37	38	39	40
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	43563.	43579.	43582.	43583.	43583.	43583.	43583.	43583.	43583.	43583.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.

GLOBAL TEMPERATURE (DEG.C)
....

All values for this array equal 21.10

ELAPSED SIMULATION TIME 90.72 SECS (1.0500E-03 DAYS , 2.8767E-06 YEARS)
****

TIME STEP NUMBER 4 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 38.88 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

GLOBAL PRESSURE AT ELEVATION (PA)
....

	1	2	3	4	5	6	7	8	9	10
1	43563.	43564.	43565.	43566.	43566.	43567.	43568.	43569.	43570.	43571.
2	-48036.	-43651.	-39267.	-34883.	-30500.	-26116.	-21733.	-17351.	-12970.	-8590.2

	11	12	13	14	15	16	17	18	19	20
1	43572.	43573.	43573.	43574.	43575.	43576.	43577.	43578.	43578.	43579.
2	-4212.7	161.49	4530.7	8892.4	13243.	17577.	21887.	26161.	30382.	34526.

	21	22	23	24	25	26	27	28	29	30
1	43580.	43581.	43581.	43582.	43582.	43582.	43583.	43583.	43583.	43583.
2	38558.	42432.	46086.	49442.	52413.	54912.	56874.	58280.	59174.	59664.

	31	32	33	34	35	36	37	38	39	40
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	59888.	59971.	59994.	59999.	60000.	60000.	60000.	60000.	60000.	60000.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.

GLOBAL PRESSURE AT DATUM (PA)
....

	1	2	3	4	5	6	7	8	9	10
1	43563.	43564.	43565.	43566.	43566.	43567.	43568.	43569.	43570.	43571.
2	-64452.	-60068.	-55684.	-51300.	-46917.	-42533.	-38150.	-33768.	-29387.	-25007.

	11	12	13	14	15	16	17	18	19	20
1	43572.	43573.	43573.	43574.	43575.	43576.	43577.	43578.	43578.	43579.
2	-20630.	-16255.	-11886.	-7524.5	-3173.8	1160.4	5470.3	9744.2	13965.	18109.

	21	22	23	24	25	26	27	28	29	30
1	43580.	43581.	43581.	43582.	43582.	43582.	43583.	43583.	43583.	43583.
2	22141.	26015.	29669.	33025.	35996.	38495.	40457.	41863.	42757.	43248.

	31	32	33	34	35	36	37	38	39	40
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	43472.	43554.	43577.	43582.	43583.	43583.	43583.	43583.	43583.	43583.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.

GLOBAL TEMPERATURE (DEG.C)
....

All values for this array equal 21.10

ELAPSED SIMULATION TIME 149.0 SECS (1.7250E-03 DAYS , 4.7260E-06 YEARS)
****

TIME STEP NUMBER 5 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 58.32 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

GLOBAL PRESSURE AT ELEVATION (PA)

	1	2	3	4	5	6	7	8	9	10
1	43548.	43550.	43551.	43553.	43554.	43555.	43557.	43558.	43560.	43561.
2	-53696.	-49312.	-44928.	-40544.	-36160.	-31776.	-27393.	-23009.	-18627.	-14245.

	11	12	13	14	15	16	17	18	19	20
1	43563.	43564.	43566.	43567.	43568.	43570.	43571.	43573.	43574.	43575.
2	-9864.9	-5486.5	-1111.0	3260.2	7625.0	11980.	16321.	20641.	24930.	29173.

21	22	23	24	25	26	27	28	29	30

1	43576.	43578.	43579.	43580.	43581.	43581.	43582.	43582.	43583.	43583.
2	33348.	37425.	41361.	45100.	48566.	51673.	54328.	56453.	58009.	59024.

	31	32	33	34	35	36	37	38	39	40
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	59595.	59863.	59963.	59993.	59999.	60000.	60000.	60000.	60000.	60000.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.

GLOBAL PRESSURE AT DATUM (PA)

....

	1	2	3	4	5	6	7	8	9	10
1	43548.	43550.	43551.	43553.	43554.	43555.	43557.	43558.	43560.	43561.
2	-70113.	-65729.	-61345.	-56961.	-52577.	-48193.	-43810.	-39426.	-35044.	-30662.

	11	12	13	14	15	16	17	18	19	20
1	43563.	43564.	43566.	43567.	43568.	43570.	43571.	43573.	43574.	43575.
2	-26282.	-21903.	-17528.	-13157.	-8791.9	-4436.7	-95.640	4224.3	8513.0	12756.

21	22	23	24	25	26	27	28	29	30

1	43576.	43578.	43579.	43580.	43581.	43581.	43582.	43582.	43583.	43583.
2	16931.	21008.	24944.	28683.	32149.	35256.	37911.	40036.	41592.	42607.

	31	32	33	34	35	36	37	38	39	40
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	43179.	43446.	43546.	43576.	43582.	43583.	43583.	43583.	43583.	43583.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.

GLOBAL TEMPERATURE (DEG.C)

....

All values for this array equal 21.10

ELAPSED SIMULATION TIME 236.5 SECS (2.7375E-03 DAYS , 7.5000E-06 YEARS)

****

TIME STEP NUMBER 6 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 87.48 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

GLOBAL PRESSURE AT ELEVATION (PA)

	1	2	3	4	5	6	7	8	9	10
1	43525.	43527.	43530.	43532.	43534.	43537.	43539.	43541.	43544.	43546.
2	-58869.	-54485.	-50101.	-45717.	-41333.	-36949.	-32565.	-28181.	-23798.	-19415.

	11	12	13	14	15	16	17	18	19	20
1	43548.	43550.	43553.	43555.	43557.	43559.	43562.	43564.	43566.	43568.
2	-15034.	-10653.	-6274.0	-1897.8	2474.5	6840.9	11198.	15543.	19868.	24165.

	21	22	23	24	25	26	27	28	29	30
1	43570.	43572.	43574.	43576.	43578.	43579.	43580.	43581.	43582.	43582.
2	28419.	32611.	36713.	40684.	44470.	48000.	51187.	53937.	56165.	57820.

	31	32	33	34	35	36	37	38	39	40
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	58917.	59545.	59843.	59958.	59991.	59999.	60000.	60000.	60000.	60000.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.

GLOBAL PRESSURE AT DATUM (PA)

....

	1	2	3	4	5	6	7	8	9	10
1	43525.	43527.	43530.	43532.	43534.	43537.	43539.	43541.	43544.	43546.
2	-75286.	-70902.	-66518.	-62134.	-57750.	-53366.	-48982.	-44598.	-40215.	-35832.

	11	12	13	14	15	16	17	18	19	20
1	43548.	43550.	43553.	43555.	43557.	43559.	43562.	43564.	43566.	43568.
2	-31450.	-27070.	-22691.	-18315.	-13942.	-9576.0	-5218.4	-873.86	3451.3	7747.9

	21	22	23	24	25	26	27	28	29	30
1	43570.	43572.	43574.	43576.	43578.	43579.	43580.	43581.	43582.	43582.
2	12002.	16194.	20296.	24267.	28053.	31583.	34770.	37520.	39748.	41403.

	31	32	33	34	35	36	37	38	39	40
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.

2	42500.	43128.	43427.	43541.	43574.	43582.	43583.	43583.	43583.	43583.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.

GLOBAL TEMPERATURE (DEG.C)
....

All values for this array equal 21.10

ELAPSED SIMULATION TIME 367.7 SECS (4.2563E-03 DAYS , 1.1661E-05 YEARS)
****

TIME STEP NUMBER 7 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 131.2 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

GLOBAL PRESSURE AT ELEVATION (PA)

....

	1	2	3	4	5	6	7	8	9	10
1	43489.	43493.	43496.	43500.	43504.	43507.	43511.	43514.	43518.	43521.
2	-63753.	-59369.	-54984.	-50600.	-46216.	-41832.	-37448.	-33064.	-28681.	-24297.

	11	12	13	14	15	16	17	18	19	20
1	43525.	43528.	43532.	43536.	43539.	43543.	43546.	43550.	43553.	43556.
2	-19915.	-15533.	-11152.	-6772.6	-2396.0	1976.8	6344.0	10703.	15049.	19378.

	21	22	23	24	25	26	27	28	29	30
1	43560.	43563.	43566.	43569.	43572.	43574.	43577.	43579.	43580.	43581.
2	23678.	27939.	32141.	36256.	40247.	44061.	47629.	50866.	53675.	55968.

	31	32	33	34	35	36	37	38	39	40
1	43582.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	57688.	58841.	59508.	59829.	59953.	59990.	59999.	60000.	60000.	60000.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.

GLOBAL PRESSURE AT DATUM (PA)

	1	2	3	4	5	6	7	8	9	10
1	43489.	43493.	43496.	43500.	43504.	43507.	43511.	43514.	43518.	43521.
2	-80170.	-75785.	-71401.	-67017.	-62633.	-58249.	-53865.	-49481.	-45097.	-40714.

	11	12	13	14	15	16	17	18	19	20
1	43525.	43528.	43532.	43536.	43539.	43543.	43546.	43550.	43553.	43556.
2	-36331.	-31949.	-27569.	-23190.	-18813.	-14440.	-10073.	-5714.0	-1367.5	2960.6

	21	22	23	24	25	26	27	28	29	30
1	43560.	43563.	43566.	43569.	43572.	43574.	43577.	43579.	43580.	43581.
2	7261.5	11522.	15724.	19839.	23830.	27644.	31212.	34449.	37258.	39552.

	31	32	33	34	35	36	37	38	39	40
1	43582.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	41272.	42424.	43091.	43412.	43536.	43573.	43582.	43583.	43583.	43583.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.

GLOBAL TEMPERATURE (DEG.C)

All values for this array equal 21.10

ELAPSED SIMULATION TIME 564.6 SECS (6.5344E-03 DAYS , 1.7902E-05 YEARS)
****

TIME STEP NUMBER 8 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 196.8 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

GLOBAL PRESSURE AT ELEVATION (PA)

	1	2	3	4	5	6	7	8	9	10
1	43433.	43439.	43444.	43450.	43455.	43461.	43466.	43472.	43477.	43483.
2	-68451.	-64067.	-59682.	-55298.	-50914.	-46530.	-42146.	-37762.	-33378.	-28994.

	11	12	13	14	15	16	17	18	19	20
1	43488.	43494.	43499.	43504.	43510.	43515.	43521.	43526.	43531.	43537.
2	-24611.	-20228.	-15846.	-11465.	-7086.2	-2709.4	1663.7	6031.3	10391.	14738.

	21	22	23	24	25	26	27	28	29	30
1	43542.	43547.	43552.	43557.	43561.	43566.	43570.	43573.	43576.	43578.
2	19068.	23371.	27635.	31842.	35965.	39968.	43798.	47389.	50655.	53502.

	31	32	33	34	35	36	37	38	39	40
1	43580.	43582.	43582.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	55837.	57599.	58788.	59482.	59819.	59950.	59990.	59998.	60000.	60000.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.

GLOBAL PRESSURE AT DATUM (PA)
....

	1	2	3	4	5	6	7	8	9	10
1	43433.	43439.	43444.	43450.	43455.	43461.	43466.	43472.	43477.	43483.

2	-84868.	-80484.	-76099.	-71715.	-67331.	-62947.	-58563.	-54179.	-49795.	-45411.

	11	12	13	14	15	16	17	18	19	20
1	43488.	43494.	43499.	43504.	43510.	43515.	43521.	43526.	43531.	43537.
2	-41028.	-36645.	-32263.	-27882.	-23503.	-19126.	-14753.	-10386.	-6026.1	-1678.7

	21	22	23	24	25	26	27	28	29	30
1	43542.	43547.	43552.	43557.	43561.	43566.	43570.	43573.	43576.	43578.
2	2650.9	6954.0	11218.	15425.	19548.	23551.	27381.	30972.	34238.	37085.

	31	32	33	34	35	36	37	38	39	40
1	43580.	43582.	43582.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	39420.	41182.	42371.	43065.	43402.	43533.	43573.	43581.	43583.	43583.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.

GLOBAL TEMPERATURE (DEG.C)
....

All values for this array equal 21.10

ELAPSED SIMULATION TIME 859.8 SECS (9.9516E-03 DAYS , 2.7265E-05 YEARS)
****

TIME STEP NUMBER 9 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 295.2 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

GLOBAL PRESSURE AT ELEVATION (PA)

	1	2	3	4	5	6	7	8	9	10
1	43346.	43355.	43363.	43371.	43380.	43388.	43396.	43405.	43413.	43421.
2	-73020.	-68636.	-64251.	-59867.	-55483.	-51099.	-46714.	-42330.	-37946.	-33563.

	11	12	13	14	15	16	17	18	19	20
1	43430.	43438.	43446.	43455.	43463.	43471.	43480.	43488.	43496.	43504.
2	-29179.	-24796.	-20413.	-16031.	-11650.	-7270.9	-2894.1	1479.0	5846.6	10206.

21 22 23 24 25 26 27 28 29 30

1	43512.	43520.	43528.	43536.	43543.	43550.	43556.	43562.	43568.	43572.
2	14554.	18884.	23188.	27453.	31662.	35789.	39797.	43636.	47239.	50523.

	31	32	33	34	35	36	37	38	39	40
1	43576.	43579.	43581.	43582.	43583.	43583.	43583.	43583.	43583.	43583.
2	53391.	55751.	57540.	58753.	59465.	59812.	59948.	59989.	59998.	60000.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.

GLOBAL PRESSURE AT DATUM (PA)
....

	1	2	3	4	5	6	7	8	9	10
1	43346.	43355.	43363.	43371.	43380.	43388.	43396.	43405.	43413.	43421.
2	-89437.	-85052.	-80668.	-76284.	-71900.	-67516.	-63131.	-58747.	-54363.	-49979.

	11	12	13	14	15	16	17	18	19	20
1	43430.	43438.	43446.	43455.	43463.	43471.	43480.	43488.	43496.	43504.
2	-45596.	-41213.	-36830.	-32448.	-28067.	-23688.	-19311.	-14938.	-10570.	-6210.7

	21	22	23	24	25	26	27	28	29	30
1	43512.	43520.	43528.	43536.	43543.	43550.	43556.	43562.	43568.	43572.
2	-1863.0	2467.0	6771.0	11036.	15245.	19372.	23380.	27220.	30823.	34106.

	31	32	33	34	35	36	37	38	39	40
1	43576.	43579.	43581.	43582.	43583.	43583.	43583.	43583.	43583.	43583.
2	36974.	39334.	41123.	42336.	43048.	43395.	43531.	43572.	43581.	43583.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.

GLOBAL TEMPERATURE (DEG.C)
....

All values for this array equal 21.10

ELAPSED SIMULATION TIME 1303. SECS (1.5077E-02 DAYS , 4.1308E-05 YEARS)
****

TIME STEP NUMBER 10 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 442.9 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

GLOBAL PRESSURE AT ELEVATION (PA)

	1	2	3	4	5	6	7	8	9	10
1	43212.	43224.	43237.	43250.	43262.	43275.	43288.	43300.	43313.	43326.
2	-77488.	-73104.	-68719.	-64335.	-59951.	-55567.	-51182.	-46798.	-42414.	-38030.

	11	12	13	14	15	16	17	18	19	20
1	43338.	43351.	43363.	43376.	43389.	43401.	43414.	43426.	43439.	43451.
2	-33646.	-29263.	-24880.	-20497.	-16115.	-11734.	-7355.2	-2978.6	1394.3	5761.8

	21	22	23	24	25	26	27	28	29	30
1	43463.	43476.	43488.	43499.	43511.	43522.	43533.	43543.	43552.	43560.
2	10121.	14468.	18798.	23101.	27366.	31575.	35702.	39711.	43553.	47160.

	31	32	33	34	35	36	37	38	39	40
1	43567.	43572.	43577.	43580.	43581.	43582.	43583.	43583.	43583.	43583.

2	50451.	53329.	55702.	57505.	58732.	59454.	59808.	59947.	59989.	59998.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.

GLOBAL PRESSURE AT DATUM (PA)

....

	1	2	3	4	5	6	7	8	9	10
1	43212.	43224.	43237.	43250.	43262.	43275.	43288.	43300.	43313.	43326.
2	-93905.	-89521.	-85136.	-80752.	-76368.	-71984.	-67599.	-63215.	-58831.	-54447.

	11	12	13	14	15	16	17	18	19	20
1	43338.	43351.	43363.	43376.	43389.	43401.	43414.	43426.	43439.	43451.
2	-50063.	-45680.	-41297.	-36914.	-32532.	-28151.	-23772.	-19395.	-15023.	-10655.

	21	22	23	24	25	26	27	28	29	30
1	43463.	43476.	43488.	43499.	43511.	43522.	43533.	43543.	43552.	43560.
2	-6295.9	-1948.6	2381.0	6684.5	10949.	15158.	19285.	23295.	27136.	30743.

	31	32	33	34	35	36	37	38	39	40

```
 1  43567.   43572.   43577.   43580.   43581.   43582.   43583.   43583.   43583.   43583.
 2  34034.   36912.   39285.   41088.   42315.   43037.   43391.   43530.   43572.   43581.

      41       42       43       44       45       46       47       48       49       50

 1  43583.   43583.   43583.   43583.   43583.   43583.   43583.   43583.   43583.   43583.
 2  43583.   43583.   43583.   43583.   43583.   43583.   43583.   43583.   43583.   43583.


                    GLOBAL TEMPERATURE (DEG.C)
                    ..........................

                All values for this array equal   21.10


--------------------------------------------------------------------------------------------


        ELAPSED SIMULATION TIME  1800.   SECS ( 2.0833E-02 DAYS  , 5.7078E-05 YEARS )
        ****************************************************************************

      TIME STEP NUMBER   11   NUMBER OF OUTER ITERATIONS   1   CURRENT TIME STEP  497.3    SECS

                    FLUID (KG)      ENERGY (J)      BRINE (KG)
                   ............    ............    ............
 (GLOBAL+LOCAL)  MASS OR HEAT BALANCE    1.0000       *******       *******
        WELL SUMMARY
         TOTAL PRODUCTION      2.5200E+04    2.2268E+09    0.0000E+00
         TOTAL INJECTION     0.0000E+00    0.0000E+00    0.0000E+00
        AQUIFER-INFLUENCE FUNCTION
```

```
 TOTAL INFLUX (+)         1.2022E-14       1.0637E-09      0.0000E+00
 TOTAL EFFLUX (-)         8.1877E-13       7.2458E-08      0.0000E+00
 CUMULATIVE FLUX         -8.0675E-13      -7.1394E-08      0.0000E+00
TOTAL IN PLACE           1.538950E+10     1.360982E+15    0.000000E+00
INITIAL IN PLACE         1.538952E+10     1.360984E+15    0.000000E+00
CHANGE IN PLACE          -25200.0         0.000000E+00    0.000000E+00

MAXIMUM CHANGE AT BLK     ( 1, 1, 2)      ( 50, 1, 2)      ( 50, 1, 2)
 OVER LAST TIME STEP      -3532.   (PA)   0.0000E+00(DEG.C)  0.0000E+00

AVERAGE PRESSURE  4.3581E+04 (PA)     HEAT LOSS TO OVER/UNDRBRDN  0.0000E+00 (J)


                    WELL OPERATION SUMMARY
.......................................................................................
          PRODUCTION RATES      CUMULATIVE PRODUCTION      CUMULATIVE INJECTION   GRID      PRESSURE     TEMP.
WELL LOCATION  WATER   ENERGY    BRINE   WATER   ENERGY   BRINE   WATER   ENERGY   BRINE BLOCK   BHP   SURFACE BOT SUR
NO  I  J  K  (KG/SEC) (J/SEC)   (KG/SEC)  (KG)    (J)     (KG)    (KG)     (J)     (KG)  PRESS    (PA)     (DEG.C)
.......................................................................................
 1  1  1  2- 2  1.40E+01  1.24E+06  0.00E+00  2.52E+04 2.23E+09 0.00E+00 0.00E+00 0.00E+00 0.00E+00-8.10E+4-1.09E+5 0.00E+0 21.  0.
 2 22  1  2- 2  0.00E+00  0.00E+00  0.00E+00  0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 1.10E+4 1.10E+4 0.00E+0 21.  0.
 3 30  1  2- 2  0.00E+00  0.00E+00  0.00E+00  0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 0.00E+00 4.43E+4 4.43E+4 0.00E+0 21.  0.
          ..............................................................
TOTALS - PROD   1.40E+01  1.24E+06  0.00E+00  2.52E+04 2.23E+09 0.00E+00
     - INJ   0.00E+00  0.00E+00  0.00E+00                    0.00E+00 0.00E+00 0.00E+00



               *** GLOBAL (FRACTURE) DEPENDENT VALUES ***
               ------------------------------------------


                GLOBAL PRESSURE AT ELEVATION (PA)
                .................................

    1      2      3      4      5      6      7      8      9     10
```

1	43057.	43075.	43092.	43109.	43127.	43144.	43162.	43179.	43197.	43214.
2	-81019.	-76635.	-72251.	-67867.	-63482.	-59098.	-54714.	-50330.	-45946.	-41562.
	11	12	13	14	15	16	17	18	19	20
1	43231.	43249.	43266.	43284.	43301.	43319.	43336.	43353.	43370.	43388.
2	-37178.	-32794.	-28410.	-24027.	-19645.	-15263.	-10883.	-6504.3	-2128.5	2243.2
	21	22	23	24	25	26	27	28	29	30
1	43405.	43422.	43439.	43455.	43471.	43487.	43502.	43517.	43530.	43542.
2	6609.0	10966.	15310.	19634.	23930.	28185.	32380.	36486.	40467.	44270.
	31	32	33	34	35	36	37	38	39	40
1	43553.	43562.	43570.	43575.	43579.	43581.	43582.	43583.	43583.	43583.
2	47825.	51048.	53840.	56112.	57805.	58926.	59560.	59855.	59963.	59993.
	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	59999.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.

GLOBAL PRESSURE AT DATUM (PA)
....

1	2	3	4	5	6	7	8	9	10

1	43057.	43075.	43092.	43109.	43127.	43144.	43162.	43179.	43197.	43214.
2	-97436.	-93052.	-88668.	-84284.	-79899.	-75515.	-71131.	-66747.	-62363.	-57978.

	11	12	13	14	15	16	17	18	19	20
1	43231.	43249.	43266.	43284.	43301.	43319.	43336.	43353.	43370.	43388.
2	-53595.	-49211.	-44827.	-40444.	-36062.	-31680.	-27300.	-22921.	-18545.	-14174.

	21	22	23	24	25	26	27	28	29	30
1	43405.	43422.	43439.	43455.	43471.	43487.	43502.	43517.	43530.	43542.
2	-9808.0	-5451.1	-1107.3	3217.2	7513.5	11768.	15963.	20070.	24051.	27853.

	31	32	33	34	35	36	37	38	39	40
1	43553.	43562.	43570.	43575.	43579.	43581.	43582.	43583.	43583.	43583.
2	31408.	34631.	37423.	39695.	41389.	42509.	43143.	43438.	43546.	43576.

	41	42	43	44	45	46	47	48	49	50
1	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.
2	43582.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.	43583.

GLOBAL TEMPERATURE (DEG.C)
....

All values for this array equal 21.10

```
AQUIFER INFLUX RATES  (POSITIVE-IN : NEGATIVE-OUT)
.................................................

INFLUENCE BLK NO       1          2
BLOCK (I,J,K)   ( 50,  1,  1)( 50,  1,  2)(
FLUID  (KG/SEC)   8.107E-18   -5.032E-16


==========================================================================================================

NORMAL TERMINATION   (ITIME =   11 ; TIME =  1800.    )
     CPU elapsed time =  9.121     seconds
```

```
PROB. 3.  (MR) ++ FLOW VERIFICATION - SI (METRIC) - RADIAL COORDS
PROB. 3.0 Flow and Transport in Hetrogeneous System (Batu, 1984).
  4  0  0  0  0  0  0  1  0  0000                              M-2
  40  1  10  2  0  1  0  2  0 20 0 0  00                        M-3-1
  0  0  0  0                                                    M-3-2
0.  0.   0.    0.    0.                                         R1-1
0.    0.    0.    0.  1.E-30   1.E-30 1.E-50                    R1-2
1690.  0.  21.1   1000.   1000.                                 R1-3
  0  0  0  2                                                    R1-6
21.1  .001   21.1   .001                                        R1-7
0. 21.1
5. 21.1
  0  0                                                          R1-12
21.1  0.  0.  4.75                                              R1-16
40*.5
.5
10*.5
.8644e-3 0. 0. .40 0. 0. 0.
 1 1 1 1 1 1
  .8644E-03 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
 1 1 1 1 2 2
  .9553E-03 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
 1 1 1 1 3 3
  .1056E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
 1 1 1 1 4 4
  .1167E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
 1 1 1 1 5 5
  .1290E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
 1 1 1 1 6 6
  .1425E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
 1 1 1 1 7 7
  .1575E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
 1 1 1 1 8 8
  .1741E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
 1 1 1 1 9 9
  .1924E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
 1 1 1 1 10 10
  .2126E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
 2 2 1 1 1 1
  .8863E-03 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
 2 2 1 1 2 2
```

```
 .9795E-03 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
2 2 1 1 3 3
 .1082E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
2 2 1 1 4 4
 .1196E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
2 2 1 1 5 5
 .1322E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
2 2 1 1 6 6
 .1461E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
2 2 1 1 7 7
 .1615E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
2 2 1 1 8 8
 .1785E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
2 2 1 1 9 9
 .1972E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
2 2 1 1 10 10
 .2180E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
3 3 1 1 1 1
 .9087E-03 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
3 3 1 1 2 2
 .1004E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
3 3 1 1 3 3
 .1110E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
3 3 1 1 4 4
 .1227E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
3 3 1 1 5 5
 .1356E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
3 3 1 1 6 6
 .1498E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
3 3 1 1 7 7
 .1656E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
3 3 1 1 8 8
 .1830E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
3 3 1 1 9 9
 .2022E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
3 3 1 1 10 10
 .2235E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
4 4 1 1 1 1
 .9317E-03 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
4 4 1 1 2 2
 .1030E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
```

```
4 4 1 1 3 3
 .1138E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
4 4 1 1 4 4
 .1258E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
4 4 1 1 5 5
 .1390E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
4 4 1 1 6 6
 .1536E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
4 4 1 1 7 7
 .1698E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
4 4 1 1 8 8
 .1876E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
4 4 1 1 9 9
 .2074E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
4 4 1 1 10 10
 .2292E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
5 5 1 1 1 1
 .9553E-03 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
5 5 1 1 2 2
 .1056E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
5 5 1 1 3 3
 .1167E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
5 5 1 1 4 4
 .1290E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
5 5 1 1 5 5
 .1425E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
5 5 1 1 6 6
 .1575E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
5 5 1 1 7 7
 .1741E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
5 5 1 1 8 8
 .1924E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
5 5 1 1 9 9
 .2126E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
5 5 1 1 10 10
 .2350E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
6 6 1 1 1 1
 .9795E-03 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
6 6 1 1 2 2
 .1082E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
6 6 1 1 3 3
```

```
 .1196E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
6 6 1 1 4 4
 .1322E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
6 6 1 1 5 5
 .1461E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
6 6 1 1 6 6
 .1615E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
6 6 1 1 7 7
 .1785E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
6 6 1 1 8 8
 .1972E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
6 6 1 1 9 9
 .2180E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
6 6 1 1 10 10
 .2409E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
7 7 1 1 1 1
 .1004E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
7 7 1 1 2 2
 .1110E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
7 7 1 1 3 3
 .1227E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
7 7 1 1 4 4
 .1356E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
7 7 1 1 5 5
 .1498E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
7 7 1 1 6 6
 .1656E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
7 7 1 1 7 7
 .1830E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
7 7 1 1 8 8
 .2022E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
7 7 1 1 9 9
 .2235E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
7 7 1 1 10 10
 .2470E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
8 8 1 1 1 1
 .1030E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
8 8 1 1 2 2
 .1138E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
8 8 1 1 3 3
 .1258E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
```

```
8 8 1 1 4 4
 .1390E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
8 8 1 1 5 5
 .1536E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
8 8 1 1 6 6
 .1698E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
8 8 1 1 7 7
 .1876E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
8 8 1 1 8 8
 .2074E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
8 8 1 1 9 9
 .2292E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
8 8 1 1 10 10
 .2533E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
9 9 1 1 1 1
 .1056E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
9 9 1 1 2 2
 .1167E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
9 9 1 1 3 3
 .1290E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
9 9 1 1 4 4
 .1425E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
9 9 1 1 5 5
 .1575E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
9 9 1 1 6 6
 .1741E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
9 9 1 1 7 7
 .1924E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
9 9 1 1 8 8
 .2126E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
9 9 1 1 9 9
 .2350E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
9 9 1 1 10 10
 .2597E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
10 10 1 1 1 1
 .1082E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
10 10 1 1 2 2
 .1196E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
10 10 1 1 3 3
 .1322E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
10 10 1 1 4 4
```

```
 .1461E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
10 10  1  1  5  5
 .1615E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
10 10  1  1  6  6
 .1785E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
10 10  1  1  7  7
 .1972E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
10 10  1  1  8  8
 .2180E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
10 10  1  1  9  9
 .2409E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
10 10  1  1 10 10
 .2662E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
11 11  1  1  1  1
 .1110E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
11 11  1  1  2  2
 .1227E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
11 11  1  1  3  3
 .1356E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
11 11  1  1  4  4
 .1498E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
11 11  1  1  5  5
 .1656E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
11 11  1  1  6  6
 .1830E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
11 11  1  1  7  7
 .2022E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
11 11  1  1  8  8
 .2235E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
11 11  1  1  9  9
 .2470E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
11 11  1  1 10 10
 .2730E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
12 12  1  1  1  1
 .1138E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
12 12  1  1  2  2
 .1258E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
12 12  1  1  3  3
 .1390E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
12 12  1  1  4  4
 .1536E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
```

```
12 12  1  1  5  5
 .1698E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
12 12  1  1  6  6
 .1876E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
12 12  1  1  7  7
 .2074E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
12 12  1  1  8  8
 .2292E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
12 12  1  1  9  9
 .2533E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
12 12  1  1 10 10
 .2799E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
13 13  1  1  1  1
 .1167E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
13 13  1  1  2  2
 .1290E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
13 13  1  1  3  3
 .1425E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
13 13  1  1  4  4
 .1575E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
13 13  1  1  5  5
 .1741E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
13 13  1  1  6  6
 .1924E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
13 13  1  1  7  7
 .2126E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
13 13  1  1  8  8
 .2350E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
13 13  1  1  9  9
 .2597E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
13 13  1  1 10 10
 .2870E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
14 14  1  1  1  1
 .1196E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
14 14  1  1  2  2
 .1322E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
14 14  1  1  3  3
 .1461E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
14 14  1  1  4  4
 .1615E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
14 14  1  1  5  5
```

```
 .1785E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
14 14  1  1  6  6
 .1972E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
14 14  1  1  7  7
 .2180E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
14 14  1  1  8  8
 .2409E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
14 14  1  1  9  9
 .2662E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
14 14  1  1 10 10
 .2942E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
15 15  1  1  1  1
 .1227E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
15 15  1  1  2  2
 .1356E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
15 15  1  1  3  3
 .1498E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
15 15  1  1  4  4
 .1656E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
15 15  1  1  5  5
 .1830E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
15 15  1  1  6  6
 .2022E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
15 15  1  1  7  7
 .2235E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
15 15  1  1  8  8
 .2470E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
15 15  1  1  9  9
 .2730E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
15 15  1  1 10 10
 .3017E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
16 16  1  1  1  1
 .1258E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
16 16  1  1  2  2
 .1390E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
16 16  1  1  3  3
 .1536E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
16 16  1  1  4  4
 .1698E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
16 16  1  1  5  5
 .1876E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
```

```
16 16  1  1  6  6
 .2074E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
16 16  1  1  7  7
 .2292E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
16 16  1  1  8  8
 .2533E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
16 16  1  1  9  9
 .2799E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
16 16  1  1 10 10
 .3093E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
17 17  1  1  1  1
 .1290E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
17 17  1  1  2  2
 .1425E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
17 17  1  1  3  3
 .1575E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
17 17  1  1  4  4
 .1741E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
17 17  1  1  5  5
 .1924E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
17 17  1  1  6  6
 .2126E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
17 17  1  1  7  7
 .2350E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
17 17  1  1  8  8
 .2597E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
17 17  1  1  9  9
 .2870E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
17 17  1  1 10 10
 .3172E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
18 18  1  1  1  1
 .1322E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
18 18  1  1  2  2
 .1461E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
18 18  1  1  3  3
 .1615E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
18 18  1  1  4  4
 .1785E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
18 18  1  1  5  5
 .1972E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
18 18  1  1  6  6
```

```
 .2180E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
18 18  1  1  7  7
 .2409E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
18 18  1  1  8  8
 .2662E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
18 18  1  1  9  9
 .2942E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
18 18  1  1 10 10
 .3252E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
19 19  1  1  1  1
 .1356E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
19 19  1  1  2  2
 .1498E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
19 19  1  1  3  3
 .1656E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
19 19  1  1  4  4
 .1830E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
19 19  1  1  5  5
 .2022E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
19 19  1  1  6  6
 .2235E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
19 19  1  1  7  7
 .2470E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
19 19  1  1  8  8
 .2730E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
19 19  1  1  9  9
 .3017E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
19 19  1  1 10 10
 .3334E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
20 20  1  1  1  1
 .1390E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
20 20  1  1  2  2
 .1536E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
20 20  1  1  3  3
 .1698E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
20 20  1  1  4  4
 .1876E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
20 20  1  1  5  5
 .2074E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
20 20  1  1  6  6
 .2292E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
```

```
20 20  1  1  7  7
 .2533E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
20 20  1  1  8  8
 .2799E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
20 20  1  1  9  9
 .3093E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
20 20  1  1 10 10
 .3419E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
21 21  1  1  1  1
 .1425E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
21 21  1  1  2  2
 .1575E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
21 21  1  1  3  3
 .1741E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
21 21  1  1  4  4
 .1924E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
21 21  1  1  5  5
 .2126E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
21 21  1  1  6  6
 .2350E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
21 21  1  1  7  7
 .2597E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
21 21  1  1  8  8
 .2870E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
21 21  1  1  9  9
 .3172E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
21 21  1  1 10 10
 .3505E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
22 22  1  1  1  1
 .1461E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
22 22  1  1  2  2
 .1615E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
22 22  1  1  3  3
 .1785E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
22 22  1  1  4  4
 .1972E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
22 22  1  1  5  5
 .2180E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
22 22  1  1  6  6
 .2409E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
22 22  1  1  7  7
```

```
 .2662E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
22 22  1  1  8  8
 .2942E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
22 22  1  1  9  9
 .3252E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
22 22  1  1 10 10
 .3594E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
23 23  1  1  1  1
 .1498E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
23 23  1  1  2  2
 .1656E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
23 23  1  1  3  3
 .1830E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
23 23  1  1  4  4
 .2022E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
23 23  1  1  5  5
 .2235E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
23 23  1  1  6  6
 .2470E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
23 23  1  1  7  7
 .2730E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
23 23  1  1  8  8
 .3017E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
23 23  1  1  9  9
 .3334E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
23 23  1  1 10 10
 .3685E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
24 24  1  1  1  1
 .1536E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
24 24  1  1  2  2
 .1698E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
24 24  1  1  3  3
 .1876E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
24 24  1  1  4  4
 .2074E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
24 24  1  1  5  5
 .2292E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
24 24  1  1  6  6
 .2533E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
24 24  1  1  7  7
 .2799E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
```

```
24 24  1  1  8  8
 .3093E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
24 24  1  1  9  9
 .3419E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
24 24  1  1 10 10
 .3778E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
25 25  1  1  1  1
 .1575E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
25 25  1  1  2  2
 .1741E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
25 25  1  1  3  3
 .1924E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
25 25  1  1  4  4
 .2126E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
25 25  1  1  5  5
 .2350E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
25 25  1  1  6  6
 .2597E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
25 25  1  1  7  7
 .2870E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
25 25  1  1  8  8
 .3172E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
25 25  1  1  9  9
 .3505E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
25 25  1  1 10 10
 .3874E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
26 26  1  1  1  1
 .1615E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
26 26  1  1  2  2
 .1785E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
26 26  1  1  3  3
 .1972E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
26 26  1  1  4  4
 .2180E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
26 26  1  1  5  5
 .2409E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
26 26  1  1  6  6
 .2662E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
26 26  1  1  7  7
 .2942E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
26 26  1  1  8  8
```

```
 .3252E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
26 26  1  1  9  9
 .3594E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
26 26  1  1 10 10
 .3972E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
27 27  1  1  1  1
 .1656E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
27 27  1  1  2  2
 .1830E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
27 27  1  1  3  3
 .2022E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
27 27  1  1  4  4
 .2235E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
27 27  1  1  5  5
 .2470E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
27 27  1  1  6  6
 .2730E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
27 27  1  1  7  7
 .3017E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
27 27  1  1  8  8
 .3334E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
27 27  1  1  9  9
 .3685E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
27 27  1  1 10 10
 .4073E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
28 28  1  1  1  1
 .1698E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
28 28  1  1  2  2
 .1876E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
28 28  1  1  3  3
 .2074E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
28 28  1  1  4  4
 .2292E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
28 28  1  1  5  5
 .2533E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
28 28  1  1  6  6
 .2799E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
28 28  1  1  7  7
 .3093E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
28 28  1  1  8  8
 .3419E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
```

```
28 28  1  1  9  9
 .3778E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
28 28  1  1 10 10
 .4176E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
29 29  1  1  1  1
 .1741E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
29 29  1  1  2  2
 .1924E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
29 29  1  1  3  3
 .2126E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
29 29  1  1  4  4
 .2350E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
29 29  1  1  5  5
 .2597E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
29 29  1  1  6  6
 .2870E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
29 29  1  1  7  7
 .3172E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
29 29  1  1  8  8
 .3505E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
29 29  1  1  9  9
 .3874E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
29 29  1  1 10 10
 .4281E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
30 30  1  1  1  1
 .1785E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
30 30  1  1  2  2
 .1972E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
30 30  1  1  3  3
 .2180E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
30 30  1  1  4  4
 .2409E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
30 30  1  1  5  5
 .2662E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
30 30  1  1  6  6
 .2942E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
30 30  1  1  7  7
 .3252E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
30 30  1  1  8  8
 .3594E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
30 30  1  1  9  9
```

```
 .3972E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
30 30  1  1 10 10
 .4390E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
31 31  1  1  1  1
 .1830E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
31 31  1  1  2  2
 .2022E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
31 31  1  1  3  3
 .2235E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
31 31  1  1  4  4
 .2470E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
31 31  1  1  5  5
 .2730E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
31 31  1  1  6  6
 .3017E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
31 31  1  1  7  7
 .3334E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
31 31  1  1  8  8
 .3685E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
31 31  1  1  9  9
 .4073E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
31 31  1  1 10 10
 .4501E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
32 32  1  1  1  1
 .1876E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
32 32  1  1  2  2
 .2074E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
32 32  1  1  3  3
 .2292E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
32 32  1  1  4  4
 .2533E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
32 32  1  1  5  5
 .2799E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
32 32  1  1  6  6
 .3093E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
32 32  1  1  7  7
 .3419E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
32 32  1  1  8  8
 .3778E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
32 32  1  1  9  9
 .4176E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
```

```
32 32  1  1 10 10
 .4615E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
33 33  1  1  1  1
 .1924E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
33 33  1  1  2  2
 .2126E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
33 33  1  1  3  3
 .2350E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
33 33  1  1  4  4
 .2597E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
33 33  1  1  5  5
 .2870E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
33 33  1  1  6  6
 .3172E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
33 33  1  1  7  7
 .3505E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
33 33  1  1  8  8
 .3874E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
33 33  1  1  9  9
 .4281E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
33 33  1  1 10 10
 .4732E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
34 34  1  1  1  1
 .1972E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
34 34  1  1  2  2
 .2180E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
34 34  1  1  3  3
 .2409E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
34 34  1  1  4  4
 .2662E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
34 34  1  1  5  5
 .2942E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
34 34  1  1  6  6
 .3252E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
34 34  1  1  7  7
 .3594E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
34 34  1  1  8  8
 .3972E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
34 34  1  1  9  9
 .4390E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
34 34  1  1 10 10
```

```
 .4851E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
35 35  1  1  1  1
 .2022E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
35 35  1  1  2  2
 .2235E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
35 35  1  1  3  3
 .2470E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
35 35  1  1  4  4
 .2730E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
35 35  1  1  5  5
 .3017E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
35 35  1  1  6  6
 .3334E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
35 35  1  1  7  7
 .3685E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
35 35  1  1  8  8
 .4073E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
35 35  1  1  9  9
 .4501E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
35 35  1  1 10 10
 .4974E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
36 36  1  1  1  1
 .2074E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
36 36  1  1  2  2
 .2292E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
36 36  1  1  3  3
 .2533E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
36 36  1  1  4  4
 .2799E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
36 36  1  1  5  5
 .3093E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
36 36  1  1  6  6
 .3419E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
36 36  1  1  7  7
 .3778E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
36 36  1  1  8  8
 .4176E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
36 36  1  1  9  9
 .4615E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
36 36  1  1 10 10
 .5100E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
```

```
37 37  1  1  1  1
 .2126E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
37 37  1  1  2  2
 .2350E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
37 37  1  1  3  3
 .2597E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
37 37  1  1  4  4
 .2870E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
37 37  1  1  5  5
 .3172E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
37 37  1  1  6  6
 .3505E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
37 37  1  1  7  7
 .3874E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
37 37  1  1  8  8
 .4281E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
37 37  1  1  9  9
 .4732E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
37 37  1  1 10 10
 .5229E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
38 38  1  1  1  1
 .2180E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
38 38  1  1  2  2
 .2409E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
38 38  1  1  3  3
 .2662E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
38 38  1  1  4  4
 .2942E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
38 38  1  1  5  5
 .3252E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
38 38  1  1  6  6
 .3594E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
38 38  1  1  7  7
 .3972E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
38 38  1  1  8  8
 .4390E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
38 38  1  1  9  9
 .4851E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
38 38  1  1 10 10
 .5362E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
39 39  1  1  1  1
```

```
 .2235E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
39 39  1  1  2  2
 .2470E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
39 39  1  1  3  3
 .2730E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
39 39  1  1  4  4
 .3017E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
39 39  1  1  5  5
 .3334E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
39 39  1  1  6  6
 .3685E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
39 39  1  1  7  7
 .4073E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
39 39  1  1  8  8
 .4501E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
39 39  1  1  9  9
 .4974E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
39 39  1  1 10 10
 .5497E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
40 40  1  1  1  1
 .2292E-02 .0000E+00 .0000E+00 .4000E+00 .2500E+00 .0000E+00 .0000E+00
40 40  1  1  2  2
 .2533E-02 .0000E+00 .0000E+00 .4000E+00 .7500E+00 .0000E+00 .0000E+00
40 40  1  1  3  3
 .2799E-02 .0000E+00 .0000E+00 .4000E+00 .1250E+01 .0000E+00 .0000E+00
40 40  1  1  4  4
 .3093E-02 .0000E+00 .0000E+00 .4000E+00 .1750E+01 .0000E+00 .0000E+00
40 40  1  1  5  5
 .3419E-02 .0000E+00 .0000E+00 .4000E+00 .2250E+01 .0000E+00 .0000E+00
40 40  1  1  6  6
 .3778E-02 .0000E+00 .0000E+00 .4000E+00 .2750E+01 .0000E+00 .0000E+00
40 40  1  1  7  7
 .4176E-02 .0000E+00 .0000E+00 .4000E+00 .3250E+01 .0000E+00 .0000E+00
40 40  1  1  8  8
 .4615E-02 .0000E+00 .0000E+00 .4000E+00 .3750E+01 .0000E+00 .0000E+00
40 40  1  1  9  9
 .5100E-02 .0000E+00 .0000E+00 .4000E+00 .4250E+01 .0000E+00 .0000E+00
40 40  1  1 10 10
 .5636E-02 .0000E+00 .0000E+00 .4000E+00 .4750E+01 .0000E+00 .0000E+00
 0 0 0 0 0 0                                                  R1-26-BLNK
 0 0 0 0 0 0 0  0
```

R1-27

```
 4  0
1 1 1 1 1 1 0
1.0 0.110340E+06 21.10 0.0 21.10 0
1 1 1 1 2 2 0
1.0 0.115244E+06 21.10 0.0 21.10 0
1 1 1 1 3 3 0
1.0 0.120148E+06 21.10 0.0 21.10 0
1 1 1 1 4 4 0
1.0 0.125052E+06 21.10 0.0 21.10 0
1 1 1 1 5 5 0
1.0 0.129956E+06 21.10 0.0 21.10 0
1 1 1 1 6 6 0
1.0 0.134860E+06 21.10 0.0 21.10 0
1 1 1 1 7 7 0
1.0 0.139764E+06 21.10 0.0 21.10 0
1 1 1 1 8 8 0
1.0 0.144668E+06 21.10 0.0 21.10 0
1 1 1 1 9 9 0
1.0 0.149572E+06 21.10 0.0 21.10 0
1 1 1 1 10 10 0
1.0 0.154476E+06 21.10 0.0 21.10 0
40 40 1 1 1 1 0
2.0 0.613000E+05 21.10 0.0 21.10 0
40 40 1 1 2 2 0
2.0 0.662040E+05 21.10 0.0 21.10 0
40 40 1 1 3 3 0
2.0 0.711080E+05 21.10 0.0 21.10 0
40 40 1 1 4 4 0
2.0 0.760120E+05 21.10 0.0 21.10 0
40 40 1 1 5 5 0
2.0 0.809160E+05 21.10 0.0 21.10 0
40 40 1 1 6 6 0
2.0 0.858200E+05 21.10 0.0 21.10 0
40 40 1 1 7 7 0
2.0 0.907240E+05 21.10 0.0 21.10 0
40 40 1 1 8 8 0
2.0 0.956280E+05 21.10 0.0 21.10 0
40 40 1 1 9 9 0
2.0 0.100532E+06 21.10 0.0 21.10 0
40 40 1 1 10 10 0
2.0 0.105436E+06 21.10 0.0 21.10 0
```

```
  0000000 0
000000
  0  0  0                                         I-1
0.                                                R1A-2
  0  0  1  0  0  0  0  0  0  00                   R2-1
-1 0.
0.  0. 000000                                     R2-12
  0 0  1 00 0 000010-10                           R2-13
  0  0  0  1  0  0  0  0  0  0 0                  R2-1-STOP
```

```
**************************************************
*                                                *
*    >>> S W I F T / 4 8 6 <<<                   *
*                                                *
**************************************************
*                                                *
*        SANDIA Waste-Isolation                  *
*        Flow and Transport in                   *
*        Porous and/or Fractured Media           *
*                                                *
*        Quality Assurance Version 2.53          *
*                                                *
*        --- Transport Equations ---             *
* Fluid free-water surface (steady or transient) *
*        Energy-temperature (transient)          *
* Dominant specie-brine (steady or transient)    *
*   Trace species-radionuclides (transient)      *
*                                                *
*        --- Code evolution ---                  *
*   Intera Technologies, Inc. 1975-1982          *
*        GeoTrans, Inc. 1982-1993                *
*                                                *
*        Copyright GeoTrans, Inc. 1993           *
*                                                *
**************************************************
```

```
*** TITLE CARDS ***
-------------------

***********************************************************************************
*                                                                                 *
* PROB.  3. (MR) ++ FLOW & Mass VERIFICATION - Metric System. - Cartesian COORDS  *
*                                                                                 *
* Flow Transport in Hetrogeneous System (Batu, 1984).                             *
*                                                                                 *
***********************************************************************************

*** INTEGER CONTROL SPECIFICATION ***
-------------------------------------

*** EXECUTION CONTROL OPTIONS ***
EQUATIONS SOLVING INDEX ............. NCALL.  4
RESTART RECORD NUMBER ............... RSTST..000E+00
WELLBORE DATA KEY ................... ISURF.  0
FREE WATER SURFACE OPTION ........... IFREE.  0
PLOTTING KEYS - PRESSURE ............ NPLP .  0
          - TEMPERATURE ......... NPLT .  0
          - CONCENTRATION ....... NPLC .  0
UNITS ARE IN (0=ENGLISH, 1=METRIC) .. IUNIT.  1
NUCLIDE MONITOR (UNIT9) OPTION ...... LBIO .  0
MAP[ij] {j: 0=NO,1=ASCII,2=BINARY) .. LMAPIT  0
      {i: 0=Datum, 1=Envr H, 2=Fresh Wat H}
MASS BALANCE AUXILIARY FILE (UNIT17). LMBAL   0
AQUIFER INFLUENCE FUNC FILE (UNIT18). LAIF .  0
PRINT REQUENCY FOR L2SOR ............ L2SORP  5

*** PROBLEM DIMENSIONS ***
NUMBER OF BLOCKS IN X-DIRECTION ..... NX ...  40
NUMBER OF BLOCKS IN Y-DIRECTION ..... NY ...   1
NUMBER OF BLOCKS IN Z-DIRECTION ..... NZ ...  10
```

```
INDEX OF RESERVOIR HETEROGENEITY .... HTG ..  2
NO OF RADIOACTIVE COMPONENTS ........ NCP ..  0
NUMBER OF ROCK TYPES ................ NRT ..  1
OUTPUT CONTROL INDEX ................ KOUT .  0
PRINT CONTROL KEY ................... PRT ..  2
MAX NO OF RADIOACTIVE SOURCE BLOCKS . NSMAX   0
MAX NO OF AQUIFER INFL FN BLOCKS .... NABLMX 20
MAX NO OF SURFACE RECHARGE BLOCKS ... NRCHMX  0
METHOD OF SOLUTION .................. METHOD  0


 *** WASTE INVENTORY TABLE ENTRIES ***
NUMBER OF INTERPOLATION TIMES ....... NTIME   0
REPOSITORY AREAL HEATING CONTROL .... KHEAT   0
NUMBER OF REPOSITORY BLOCKS ......... NREPB   0

 *** LOCAL (MATRIX) SUBSYSTEM CONTROL ***
SOLUTION CONTROL .................... KSLVD   0
NUMBER OF LOCAL ROCK TYPES .......... NRTD .  0
OUTPUT CONTROL KEY .................. KOUTD   0


 *** UTILIZATION OF COMMON ARRAY STORAGE ***
 -------------------------------------------

                  .............................................................
                  .               .                  .       .
                  . BLANK COMMON  .          LABELLED COMMON          .      .
                  .---------------.-----------------------------.           .
                  . REAL  INTEGER .          REAL          INTEGER .         .
                  . ------- ------- . ---------------------------- ---------.  .
                  .               .   G     G2     G3      IG  .  TOTAL .
                  .               .  -------  -------  -------  ------- . ------- .
                  .               .                  .       .
CODE DIMENSIONS : .  16403   4469 .  650000  450000  700000   140000 . 1940000 .
                  .               .                  .       .
DATA REQUIREMENTS: .  16403   4469 .   39022    9631   12401     4222 .   65276 .
                  .               .                  .       .
                  .............................................................
```

```
*** GLOBAL (FRACTURE) AND FLUID DATA ***
WATER COMPRESSIBILITY .............. CW .... 0.00000E+00 (1/PA)
ROCK COMPRESSIBILITY ............... CR .... 0.00000E+00 (1/PA)
WATER THERMAL EXPANSION FACTOR ..... CTW ... 0.00000E+00 (1/DEG.C)
WATER HEAT CAPACITY ................ CPW ... 0.00000E+00 (J/KG-DEG.C)
ROCK HEAT CAPACITY ................. CPR ... 0.00000E+00 (J/CU.M-DEG.C)
MEDIUM THERMAL COND. IN X-DIR ...... UKTX .. 0.00000E+00 (J/M-SEC-DEG.C)
MEDIUM THERMAL COND. IN Y-DIR ...... UKTY .. 0.00000E+00 (J/M-SEC-DEG.C)
MEDIUM THERMAL COND. IN Z-DIR ...... UKTZ .. 0.00000E+00 (J/M-SEC-DEG.C)
LONGITUDINAL DISPERSIVITY FACTOR ... ALPHL.. 1.00000E-30 (M)
TRANSVERSE DISPERSIVITY FACTOR ..... ALPHT.. 1.00000E-30 (M)
EFFECTIVE MOLECULAR DIFFUSION ...... DMEFF.. 1.00000E-50 (SQ.M/SEC)
ROCK DENSITY (SOLID PARTICLE) ...... BROCK.. 1.69000E+03 (KG/CU.M)
REF. PRESSURE FOR FLUID DENSITIES .. PBWR .. 0.00000E+00 (PA)
REF. TEMP. FOR FLUID DENSITIES ..... TBWR .. 2.11000E+01 (DEG.C)
FLUID DENSITY (AT C=0.0) ........... BWRN .. 1.00000E+03 (KG/CU.M)
BRINE FLUID DENSITY (AT C=1.0) ..... BWRI .. 1.00000E+03 (KG/CU.M)
```

```
    TEMPERATURE-VISCOSITY TABLE
 ..........................................
 TEMPERATURE (DEG.C)    VISCOSITY (PA-SEC)
 ..........................................

     AQUIFER FLUID (AT C=0.0)
   2.11000E+01          1.00000E-03

     SATURATED BRINE (AT C=1.0)
   2.11000E+01          1.00000E-03


   DEPTH-TEMPERATURE INITIALIZATION
 .................................
 DEPTH (M)    TEMPERATURE (DEG.C)
 .................................

  0.0000E+00        21.10
   5.000        21.10
```

```
*** REFERENCE CONDITIONS FOR FLUID AND GLOBAL SYSTEM ***
REFERENCE FLUID TEMPERATURE ........ TO .... 2.11000E+01 (DEG.C)
INITIAL AND REFERENCE PRESSURE ..... PINIT  0.00000E+00 (PA)
REFERENCE DEPTH OF INITIAL P & T ... HINIT . 0.00000E+00 (M)
DEPTH FROM REF. PLANE TO DATUM ..... HDATUM  4.75000E+00 (M)
REFERENCE WATER DENSITY (AT C=0.0) . BW0 ... 1.00000E+03 (KG/CU.M)
REFERENCE WATER INTERNAL ENERGY .... UW0 ... 8.84578E+04 (J/KG)
REFERENCE WATER ENTHALPY ........... ETH ... 8.84578E+04 (J/KG)
```

*** GLOBAL SYSTEM GRIDDING ***

X-DIRECTION GRID BLOCK DIMENSIONS (M)

	1	2	3	4	5	6	7	8	9	10
1- 10	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
11- 20	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
21- 30	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000
31- 40	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000

Y-DIRECTION GRID BLOCK DIMENSIONS (M)

	1
1- 1	0.5000

Z-DIRECTION GRID BLOCK DIMENSIONS (M)

	1	2	3	4	5	6	7	8	9	10
1- 10	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000

X-DIRECTION DISTANCE TO GRID BLOCK CENTER (M)

	1	2	3	4	5	6	7	8	9	10
1- 10	0.2500	0.7500	1.250	1.750	2.250	2.750	3.250	3.750	4.250	4.750
11- 20	5.250	5.750	6.250	6.750	7.250	7.750	8.250	8.750	9.250	9.750
21- 30	10.25	10.75	11.25	11.75	12.25	12.75	13.25	13.75	14.25	14.75
31- 40	15.25	15.75	16.25	16.75	17.25	17.75	18.25	18.75	19.25	19.75

Z-DIRECTION DISTANCE TO GRID BLOCK CENTER (M)

	1	2	3	4	5	6	7	8	9	10
1- 10	0.2500	0.7500	1.250	1.750	2.250	2.750	3.250	3.750	4.250	4.750

X-DIRECTION DISTANCE TO LEADING BLOCK EDGE (M)

	1	2	3	4	5	6	7	8	9	10
1- 10	0.0000E+00	0.5000	1.000	1.500	2.000	2.500	3.000	3.500	4.000	4.500
11- 20	5.000	5.500	6.000	6.500	7.000	7.500	8.000	8.500	9.000	9.500
21- 30	10.00	10.50	11.00	11.50	12.00	12.50	13.00	13.50	14.00	14.50

31- 40	15.00	15.50	16.00	16.50	17.00	17.50	18.00	18.50	19.00	19.50
41- 41	20.00									

Z-DIRECTION DISTANCE TO LEADING BLOCK EDGE (M)

	1	2	3	4	5	6	7	8	9	10
1- 10	0.0000E+00	0.5000	1.000	1.500	2.000	2.500	3.000	3.500	4.000	4.500
11- 11	5.000									

```
*** SPECIFICATION OF HOMOGENEOUS GLOBAL SYSTEM ***
-------------------------------------------------

HYDRAULIC CONDUCTIVITY IN X-DIR .... KX ....  8.64400E-04  (M/SEC)
HYDRAULIC CONDUCTIVITY IN Y-DIR .... KY ....  0.00000E+00  (M/SEC)
HYDRAULIC CONDUCTIVITY IN Z-DIR .... KZ ....  0.00000E+00  (M/SEC)
POROSITY ........................... PHI ...  0.40000     (FRACTION)
RESERVOIR DIP IN X-DIRECTION ....... SINX ..  0.00000E+00  (SIN OF ANGLE)
RESERVOIR DIP IN Y-DIRECTION ....... SINY ..  0.00000E+00  (SIN OF ANGLE)
DEPTH TO CENTER GRID BLOCK (1,1,1) . DEPTH .  0.00000E+00  (M)
```

```
*** SPECIFICATION OF HETERGENEOUS GLOBAL SYSTEM ***
---------------------------------------------------

..............................................................................
                        HYDRAULIC         POROSITY  DEPTH THICKNESS   ROCK
I,J AND K REGION LIMITS  CONDUCTIVITIES (M/SEC)    FRACTION  UH    UTH   HEAT-CAP.
 I1 I2 J1 J2 K1 K2   X        Y         Z      PHI     (M)    (M)  (J/CU.M-DEG.C)
..............................................................................
 1  1  1  1  1  1  8.644E-04 0.000E+00 0.000E+00 0.4000  0.2500  0.0000    0.000E+00
 1  1  1  1  2  2  9.553E-04 0.000E+00 0.000E+00 0.4000  0.7500  0.0000    0.000E+00
 1  1  1  1  3  3  1.056E-03 0.000E+00 0.000E+00 0.4000  1.2500  0.0000    0.000E+00
 1  1  1  1  4  4  1.167E-03 0.000E+00 0.000E+00 0.4000  1.7500  0.0000    0.000E+00
 1  1  1  1  5  5  1.290E-03 0.000E+00 0.000E+00 0.4000  2.2500  0.0000    0.000E+00
 1  1  1  1  6  6  1.425E-03 0.000E+00 0.000E+00 0.4000  2.7500  0.0000    0.000E+00
 1  1  1  1  7  7  1.575E-03 0.000E+00 0.000E+00 0.4000  3.2500  0.0000    0.000E+00
 1  1  1  1  8  8  1.741E-03 0.000E+00 0.000E+00 0.4000  3.7500  0.0000    0.000E+00
 1  1  1  1  9  9  1.924E-03 0.000E+00 0.000E+00 0.4000  4.2500  0.0000    0.000E+00
 1  1  1  1 10 10  2.126E-03 0.000E+00 0.000E+00 0.4000  4.7500  0.0000    0.000E+00
 2  2  1  1  1  1  8.863E-04 0.000E+00 0.000E+00 0.4000  0.2500  0.0000    0.000E+00
 2  2  1  1  2  2  9.795E-04 0.000E+00 0.000E+00 0.4000  0.7500  0.0000    0.000E+00
 2  2  1  1  3  3  1.082E-03 0.000E+00 0.000E+00 0.4000  1.2500  0.0000    0.000E+00
 2  2  1  1  4  4  1.196E-03 0.000E+00 0.000E+00 0.4000  1.7500  0.0000    0.000E+00
 2  2  1  1  5  5  1.322E-03 0.000E+00 0.000E+00 0.4000  2.2500  0.0000    0.000E+00
 2  2  1  1  6  6  1.461E-03 0.000E+00 0.000E+00 0.4000  2.7500  0.0000    0.000E+00
 2  2  1  1  7  7  1.615E-03 0.000E+00 0.000E+00 0.4000  3.2500  0.0000    0.000E+00
 2  2  1  1  8  8  1.785E-03 0.000E+00 0.000E+00 0.4000  3.7500  0.0000    0.000E+00
 2  2  1  1  9  9  1.972E-03 0.000E+00 0.000E+00 0.4000  4.2500  0.0000    0.000E+00
 2  2  1  1 10 10  2.180E-03 0.000E+00 0.000E+00 0.4000  4.7500  0.0000    0.000E+00
 3  3  1  1  1  1  9.087E-04 0.000E+00 0.000E+00 0.4000  0.2500  0.0000    0.000E+00
 3  3  1  1  2  2  1.004E-03 0.000E+00 0.000E+00 0.4000  0.7500  0.0000    0.000E+00
 3  3  1  1  3  3  1.110E-03 0.000E+00 0.000E+00 0.4000  1.2500  0.0000    0.000E+00
 3  3  1  1  4  4  1.227E-03 0.000E+00 0.000E+00 0.4000  1.7500  0.0000    0.000E+00
 3  3  1  1  5  5  1.356E-03 0.000E+00 0.000E+00 0.4000  2.2500  0.0000    0.000E+00
 3  3  1  1  6  6  1.498E-03 0.000E+00 0.000E+00 0.4000  2.7500  0.0000    0.000E+00
 3  3  1  1  7  7  1.656E-03 0.000E+00 0.000E+00 0.4000  3.2500  0.0000    0.000E+00
 3  3  1  1  8  8  1.830E-03 0.000E+00 0.000E+00 0.4000  3.7500  0.0000    0.000E+00
 3  3  1  1  9  9  2.022E-03 0.000E+00 0.000E+00 0.4000  4.2500  0.0000    0.000E+00
 3  3  1  1 10 10  2.235E-03 0.000E+00 0.000E+00 0.4000  4.7500  0.0000    0.000E+00
```

4	4	1	1	1	1	9.317E-04	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
4	4	1	1	2	2	1.030E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
4	4	1	1	3	3	1.138E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
4	4	1	1	4	4	1.258E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
4	4	1	1	5	5	1.390E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
4	4	1	1	6	6	1.536E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
4	4	1	1	7	7	1.698E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
4	4	1	1	8	8	1.876E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
4	4	1	1	9	9	2.074E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
4	4	1	1	10	10	2.292E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
5	5	1	1	1	1	9.553E-04	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
5	5	1	1	2	2	1.056E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
5	5	1	1	3	3	1.167E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
5	5	1	1	4	4	1.290E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
5	5	1	1	5	5	1.425E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
5	5	1	1	6	6	1.575E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
5	5	1	1	7	7	1.741E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
5	5	1	1	8	8	1.924E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
5	5	1	1	9	9	2.126E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
5	5	1	1	10	10	2.350E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
6	6	1	1	1	1	9.795E-04	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
6	6	1	1	2	2	1.082E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
6	6	1	1	3	3	1.196E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
6	6	1	1	4	4	1.322E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
6	6	1	1	5	5	1.461E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
6	6	1	1	6	6	1.615E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
6	6	1	1	7	7	1.785E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
6	6	1	1	8	8	1.972E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
6	6	1	1	9	9	2.180E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
6	6	1	1	10	10	2.409E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
7	7	1	1	1	1	1.004E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
7	7	1	1	2	2	1.110E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
7	7	1	1	3	3	1.227E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
7	7	1	1	4	4	1.356E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
7	7	1	1	5	5	1.498E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
7	7	1	1	6	6	1.656E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
7	7	1	1	7	7	1.830E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
7	7	1	1	8	8	2.022E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
7	7	1	1	9	9	2.235E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
7	7	1	1	10	10	2.470E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
8	8	1	1	1	1	1.030E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00

8	8	1	1	2	2	1.138E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
8	8	1	1	3	3	1.258E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
8	8	1	1	4	4	1.390E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
8	8	1	1	5	5	1.536E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
8	8	1	1	6	6	1.698E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
8	8	1	1	7	7	1.876E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
8	8	1	1	8	8	2.074E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
8	8	1	1	9	9	2.292E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
8	8	1	1	10	10	2.533E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
9	9	1	1	1	1	1.056E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
9	9	1	1	2	2	1.167E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
9	9	1	1	3	3	1.290E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
9	9	1	1	4	4	1.425E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
9	9	1	1	5	5	1.575E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
9	9	1	1	6	6	1.741E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
9	9	1	1	7	7	1.924E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
9	9	1	1	8	8	2.126E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
9	9	1	1	9	9	2.350E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
9	9	1	1	10	10	2.597E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
10	10	1	1	1	1	1.082E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
10	10	1	1	2	2	1.196E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
10	10	1	1	3	3	1.322E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
10	10	1	1	4	4	1.461E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
10	10	1	1	5	5	1.615E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
10	10	1	1	6	6	1.785E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
10	10	1	1	7	7	1.972E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
10	10	1	1	8	8	2.180E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
10	10	1	1	9	9	2.409E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
10	10	1	1	10	10	2.662E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
11	11	1	1	1	1	1.110E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
11	11	1	1	2	2	1.227E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
11	11	1	1	3	3	1.356E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
11	11	1	1	4	4	1.498E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
11	11	1	1	5	5	1.656E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
11	11	1	1	6	6	1.830E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
11	11	1	1	7	7	2.022E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
11	11	1	1	8	8	2.235E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
11	11	1	1	9	9	2.470E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
11	11	1	1	10	10	2.730E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
12	12	1	1	1	1	1.138E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
12	12	1	1	2	2	1.258E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00

12	12	1	1	3	3	1.390E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
12	12	1	1	4	4	1.536E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
12	12	1	1	5	5	1.698E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
12	12	1	1	6	6	1.876E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
12	12	1	1	7	7	2.074E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
12	12	1	1	8	8	2.292E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
12	12	1	1	9	9	2.533E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
12	12	1	1	10	10	2.799E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
13	13	1	1	1	1	1.167E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
13	13	1	1	2	2	1.290E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
13	13	1	1	3	3	1.425E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
13	13	1	1	4	4	1.575E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
13	13	1	1	5	5	1.741E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
13	13	1	1	6	6	1.924E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
13	13	1	1	7	7	2.126E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
13	13	1	1	8	8	2.350E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
13	13	1	1	9	9	2.597E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
13	13	1	1	10	10	2.870E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
14	14	1	1	1	1	1.196E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
14	14	1	1	2	2	1.322E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
14	14	1	1	3	3	1.461E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
14	14	1	1	4	4	1.615E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
14	14	1	1	5	5	1.785E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
14	14	1	1	6	6	1.972E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
14	14	1	1	7	7	2.180E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
14	14	1	1	8	8	2.409E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
14	14	1	1	9	9	2.662E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
14	14	1	1	10	10	2.942E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
15	15	1	1	1	1	1.227E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
15	15	1	1	2	2	1.356E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
15	15	1	1	3	3	1.498E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
15	15	1	1	4	4	1.656E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
15	15	1	1	5	5	1.830E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
15	15	1	1	6	6	2.022E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
15	15	1	1	7	7	2.235E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
15	15	1	1	8	8	2.470E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
15	15	1	1	9	9	2.730E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
15	15	1	1	10	10	3.017E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
16	16	1	1	1	1	1.258E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
16	16	1	1	2	2	1.390E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
16	16	1	1	3	3	1.536E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00

16	16	1	1	4	4	1.698E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
16	16	1	1	5	5	1.876E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
16	16	1	1	6	6	2.074E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
16	16	1	1	7	7	2.292E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
16	16	1	1	8	8	2.533E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
16	16	1	1	9	9	2.799E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
16	16	1	1	10	10	3.093E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
17	17	1	1	1	1	1.290E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
17	17	1	1	2	2	1.425E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
17	17	1	1	3	3	1.575E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
17	17	1	1	4	4	1.741E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
17	17	1	1	5	5	1.924E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
17	17	1	1	6	6	2.126E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
17	17	1	1	7	7	2.350E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
17	17	1	1	8	8	2.597E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
17	17	1	1	9	9	2.870E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
17	17	1	1	10	10	3.172E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
18	18	1	1	1	1	1.322E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
18	18	1	1	2	2	1.461E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
18	18	1	1	3	3	1.615E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
18	18	1	1	4	4	1.785E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
18	18	1	1	5	5	1.972E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
18	18	1	1	6	6	2.180E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
18	18	1	1	7	7	2.409E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
18	18	1	1	8	8	2.662E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
18	18	1	1	9	9	2.942E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
18	18	1	1	10	10	3.252E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
19	19	1	1	1	1	1.356E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
19	19	1	1	2	2	1.498E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
19	19	1	1	3	3	1.656E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
19	19	1	1	4	4	1.830E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
19	19	1	1	5	5	2.022E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
19	19	1	1	6	6	2.235E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
19	19	1	1	7	7	2.470E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
19	19	1	1	8	8	2.730E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
19	19	1	1	9	9	3.017E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
19	19	1	1	10	10	3.334E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
20	20	1	1	1	1	1.390E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
20	20	1	1	2	2	1.536E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
20	20	1	1	3	3	1.698E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
20	20	1	1	4	4	1.876E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00

20	20	1	1	5	5	2.074E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
20	20	1	1	6	6	2.292E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
20	20	1	1	7	7	2.533E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
20	20	1	1	8	8	2.799E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
20	20	1	1	9	9	3.093E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
20	20	1	1	10	10	3.419E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
21	21	1	1	1	1	1.425E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
21	21	1	1	2	2	1.575E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
21	21	1	1	3	3	1.741E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
21	21	1	1	4	4	1.924E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
21	21	1	1	5	5	2.126E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
21	21	1	1	6	6	2.350E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
21	21	1	1	7	7	2.597E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
21	21	1	1	8	8	2.870E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
21	21	1	1	9	9	3.172E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
21	21	1	1	10	10	3.505E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
22	22	1	1	1	1	1.461E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
22	22	1	1	2	2	1.615E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
22	22	1	1	3	3	1.785E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
22	22	1	1	4	4	1.972E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
22	22	1	1	5	5	2.180E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
22	22	1	1	6	6	2.409E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
22	22	1	1	7	7	2.662E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
22	22	1	1	8	8	2.942E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
22	22	1	1	9	9	3.252E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
22	22	1	1	10	10	3.594E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
23	23	1	1	1	1	1.498E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
23	23	1	1	2	2	1.656E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
23	23	1	1	3	3	1.830E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
23	23	1	1	4	4	2.022E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
23	23	1	1	5	5	2.235E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
23	23	1	1	6	6	2.470E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
23	23	1	1	7	7	2.730E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
23	23	1	1	8	8	3.017E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
23	23	1	1	9	9	3.334E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
23	23	1	1	10	10	3.685E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
24	24	1	1	1	1	1.536E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
24	24	1	1	2	2	1.698E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
24	24	1	1	3	3	1.876E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
24	24	1	1	4	4	2.074E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
24	24	1	1	5	5	2.292E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00

24	24	1	1	6	6	2.533E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
24	24	1	1	7	7	2.799E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
24	24	1	1	8	8	3.093E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
24	24	1	1	9	9	3.419E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
24	24	1	1	10	10	3.778E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
25	25	1	1	1	1	1.575E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
25	25	1	1	2	2	1.741E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
25	25	1	1	3	3	1.924E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
25	25	1	1	4	4	2.126E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
25	25	1	1	5	5	2.350E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
25	25	1	1	6	6	2.597E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
25	25	1	1	7	7	2.870E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
25	25	1	1	8	8	3.172E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
25	25	1	1	9	9	3.505E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
25	25	1	1	10	10	3.874E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
26	26	1	1	1	1	1.615E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
26	26	1	1	2	2	1.785E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
26	26	1	1	3	3	1.972E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
26	26	1	1	4	4	2.180E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
26	26	1	1	5	5	2.409E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
26	26	1	1	6	6	2.662E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
26	26	1	1	7	7	2.942E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
26	26	1	1	8	8	3.252E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
26	26	1	1	9	9	3.594E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
26	26	1	1	10	10	3.972E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
27	27	1	1	1	1	1.656E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
27	27	1	1	2	2	1.830E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
27	27	1	1	3	3	2.022E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
27	27	1	1	4	4	2.235E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
27	27	1	1	5	5	2.470E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
27	27	1	1	6	6	2.730E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
27	27	1	1	7	7	3.017E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
27	27	1	1	8	8	3.334E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
27	27	1	1	9	9	3.685E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
27	27	1	1	10	10	4.073E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
28	28	1	1	1	1	1.698E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
28	28	1	1	2	2	1.876E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
28	28	1	1	3	3	2.074E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
28	28	1	1	4	4	2.292E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
28	28	1	1	5	5	2.533E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
28	28	1	1	6	6	2.799E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00

28	28	1	1	7	7	3.093E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
28	28	1	1	8	8	3.419E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
28	28	1	1	9	9	3.778E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
28	28	1	1	10	10	4.176E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
29	29	1	1	1	1	1.741E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
29	29	1	1	2	2	1.924E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
29	29	1	1	3	3	2.126E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
29	29	1	1	4	4	2.350E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
29	29	1	1	5	5	2.597E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
29	29	1	1	6	6	2.870E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
29	29	1	1	7	7	3.172E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
29	29	1	1	8	8	3.505E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
29	29	1	1	9	9	3.874E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
29	29	1	1	10	10	4.281E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
30	30	1	1	1	1	1.785E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
30	30	1	1	2	2	1.972E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
30	30	1	1	3	3	2.180E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
30	30	1	1	4	4	2.409E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
30	30	1	1	5	5	2.662E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
30	30	1	1	6	6	2.942E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
30	30	1	1	7	7	3.252E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
30	30	1	1	8	8	3.594E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
30	30	1	1	9	9	3.972E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
30	30	1	1	10	10	4.390E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
31	31	1	1	1	1	1.830E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
31	31	1	1	2	2	2.022E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
31	31	1	1	3	3	2.235E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
31	31	1	1	4	4	2.470E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
31	31	1	1	5	5	2.730E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
31	31	1	1	6	6	3.017E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
31	31	1	1	7	7	3.334E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
31	31	1	1	8	8	3.685E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
31	31	1	1	9	9	4.073E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
31	31	1	1	10	10	4.501E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
32	32	1	1	1	1	1.876E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
32	32	1	1	2	2	2.074E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
32	32	1	1	3	3	2.292E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
32	32	1	1	4	4	2.533E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
32	32	1	1	5	5	2.799E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
32	32	1	1	6	6	3.093E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
32	32	1	1	7	7	3.419E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00

32	32	1	1	8	8	3.778E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
32	32	1	1	9	9	4.176E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
32	32	1	1	10	10	4.615E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
33	33	1	1	1	1	1.924E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
33	33	1	1	2	2	2.126E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
33	33	1	1	3	3	2.350E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
33	33	1	1	4	4	2.597E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
33	33	1	1	5	5	2.870E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
33	33	1	1	6	6	3.172E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
33	33	1	1	7	7	3.505E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
33	33	1	1	8	8	3.874E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
33	33	1	1	9	9	4.281E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
33	33	1	1	10	10	4.732E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
34	34	1	1	1	1	1.972E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
34	34	1	1	2	2	2.180E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
34	34	1	1	3	3	2.409E-03	0,000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
34	34	1	1	4	4	2.662E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
34	34	1	1	5	5	2.942E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
34	34	1	1	6	6	3.252E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
34	34	1	1	7	7	3.594E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
34	34	1	1	8	8	3.972E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
34	34	1	1	9	9	4.390E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
34	34	1	1	10	10	4.851E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
35	35	1	1	1	1	2.022E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
35	35	1	1	2	2	2.235E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
35	35	1	1	3	3	2.470E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
35	35	1	1	4	4	2.730E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
35	35	1	1	5	5	3.017E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
35	35	1	1	6	6	3.334E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
35	35	1	1	7	7	3.685E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
35	35	1	1	8	8	4.073E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
35	35	1	1	9	9	4.501E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
35	35	1	1	10	10	4.974E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
36	36	1	1	1	1	2.074E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
36	36	1	1	2	2	2.292E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
36	36	1	1	3	3	2.533E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
36	36	1	1	4	4	2.799E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
36	36	1	1	5	5	3.093E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
36	36	1	1	6	6	3.419E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
36	36	1	1	7	7	3.778E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
36	36	1	1	8	8	4.176E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00

36	36	1	1	9	9	4.615E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
36	36	1	1	10	10	5.100E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
37	37	1	1	1	1	2.126E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
37	37	1	1	2	2	2.350E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
37	37	1	1	3	3	2.597E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
37	37	1	1	4	4	2.870E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
37	37	1	1	5	5	3.172E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
37	37	1	1	6	6	3.505E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
37	37	1	1	7	7	3.874E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
37	37	1	1	8	8	4.281E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
37	37	1	1	9	9	4.732E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
37	37	1	1	10	10	5.229E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
38	38	1	1	1	1	2.180E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
38	38	1	1	2	2	2.409E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
38	38	1	1	3	3	2.662E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
38	38	1	1	4	4	2.942E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
38	38	1	1	5	5	3.252E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
38	38	1	1	6	6	3.594E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
38	38	1	1	7	7	3.972E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
38	38	1	1	8	8	4.390E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
38	38	1	1	9	9	4.851E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
38	38	1	1	10	10	5.362E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
39	39	1	1	1	1	2.235E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
39	39	1	1	2	2	2.470E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
39	39	1	1	3	3	2.730E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
39	39	1	1	4	4	3.017E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
39	39	1	1	5	5	3.334E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
39	39	1	1	6	6	3.685E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
39	39	1	1	7	7	4.073E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
39	39	1	1	8	8	4.501E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
39	39	1	1	9	9	4.974E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00
39	39	1	1	10	10	5.497E-03	0.000E+00	0.000E+00	0.4000	4.7500	0.0000	0.000E+00
40	40	1	1	1	1	2.292E-03	0.000E+00	0.000E+00	0.4000	0.2500	0.0000	0.000E+00
40	40	1	1	2	2	2.533E-03	0.000E+00	0.000E+00	0.4000	0.7500	0.0000	0.000E+00
40	40	1	1	3	3	2.799E-03	0.000E+00	0.000E+00	0.4000	1.2500	0.0000	0.000E+00
40	40	1	1	4	4	3.093E-03	0.000E+00	0.000E+00	0.4000	1.7500	0.0000	0.000E+00
40	40	1	1	5	5	3.419E-03	0.000E+00	0.000E+00	0.4000	2.2500	0.0000	0.000E+00
40	40	1	1	6	6	3.778E-03	0.000E+00	0.000E+00	0.4000	2.7500	0.0000	0.000E+00
40	40	1	1	7	7	4.176E-03	0.000E+00	0.000E+00	0.4000	3.2500	0.0000	0.000E+00
40	40	1	1	8	8	4.615E-03	0.000E+00	0.000E+00	0.4000	3.7500	0.0000	0.000E+00
40	40	1	1	9	9	5.100E-03	0.000E+00	0.000E+00	0.4000	4.2500	0.0000	0.000E+00

40 40 1 1 10 10 5.636E-03 0.000E+00 0.000E+00 0.4000 4.7500 0.0000 0.000E+00

DEPTH OF BLOCK CENTERS BELOW REFERENCE PLANE (M)
(Measured positive downwards)

....

	1	2	3	4	5	6	7	8	9	10
1	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000
2	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000
3	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500
4	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500
5	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500
6	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500
7	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500
8	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
9	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500
10	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500

	11	12	13	14	15	16	17	18	19	20
1	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000
2	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000
3	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500
4	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500
5	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500
6	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500
7	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500
8	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
9	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500
10	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500

	21	22	23	24	25	26	27	28	29	30
1	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000

2	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000
3	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500
4	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500
5	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500
6	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500
7	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500
8	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
9	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500
10	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500

	31	32	33	34	35	36	37	38	39	40
1	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000	0.25000
2	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000	0.75000
3	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500	1.2500
4	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500	1.7500
5	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500	2.2500
6	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500	2.7500
7	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500	3.2500
8	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500	3.7500
9	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500	4.2500
10	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500	4.7500

GLOBAL BOUNDARY PRESSURES (PA)

....

	1	2	3	4	5	6	7	8	9	10
1	1.10340E+05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	1.15244E+05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3	1.20148E+05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4	1.25052E+05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5	1.29956E+05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6	1.34860E+05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

7	1.39764E+05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
8	1.44668E+05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
9	1.49572E+05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
10	1.54476E+05	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

	11	12	13	14	15	16	17	18	19	20
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
7	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
8	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
9	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
10	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

	21	22	23	24	25	26	27	28	29	30
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
3	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
4	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
5	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
6	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
7	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
8	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
9	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
10	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

	31	32	33	34	35	36	37	38	39	40
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	61300.
2	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	66204.

3	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	71108.
4	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	76012.
5	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	80916.
6	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	85820.
7	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	90724.
8	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	95628.
9	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	1.00532E+05
10	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	1.05436E+05

GLOBAL BOUNDARY TEMPERATURES (DEG.C)

	1	2	3	4	5	6	7	8	9	10
1	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	11	12	13	14	15	16	17	18	19	20
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	21	22	23	24	25	26	27	28	29	30
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	31	32	33	34	35	36	37	38	39	40
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21.1000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21.1000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21.1000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21.1000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21.1000
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21.1000
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21.1000
8	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21.1000
9	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21.1000
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21.1000

GLOBAL BOUNDARY CONCENTRATIONS (FRACTION)
....

All values for this array equal 0.0000E+00

*** SALT DISSOLUTION ***

(PRODUCT OF DISSOLUTION RATE AND SOLUBLE FRACTION)

ROCK TYPE	PRODUCT (1/SEC)
1	0.0000E+00

GLOBAL PORE VOLUME (M**3)

All values for this array equal 5.0000E-02

GLOBAL ROCK TYPES

All values for this array equal 1

GLOBAL X-DIRECTION TRANSMISSIVITY (SQ.M/SEC)

	1	2	3	4	5	6	7	8	9	10
1	0.00000E+00	4.37607E-04	4.48680E-04	4.60028E-04	4.71676E-04	4.83624E-04	4.95799E-04	5.08417E-04	5.21419E-04	5.34421E-04
2	0.00000E+00	4.83624E-04	4.95799E-04	5.08417E-04	5.21419E-04	5.34421E-04	5.47911E-04	5.61913E-04	5.76159E-04	5.90661E-04
3	0.00000E+00	5.34421E-04	5.47911E-04	5.61913E-04	5.76159E-04	5.90661E-04	6.05651E-04	6.21153E-04	6.36900E-04	6.52902E-04
4	0.00000E+00	5.90661E-04	6.05651E-04	6.21153E-04	6.36900E-04	6.52902E-04	6.69392E-04	6.86395E-04	7.03641E-04	7.21388E-04
5	0.00000E+00	6.52902E-04	6.69392E-04	6.86395E-04	7.03641E-04	7.21388E-04	7.39634E-04	7.58381E-04	7.77628E-04	7.97375E-04
6	0.00000E+00	7.21388E-04	7.39634E-04	7.58381E-04	7.77628E-04	7.97375E-04	8.17622E-04	8.38369E-04	8.59616E-04	8.81363E-04
7	0.00000E+00	7.97375E-04	8.17622E-04	8.38369E-04	8.59616E-04	8.81363E-04	9.03610E-04	9.26357E-04	9.49848E-04	9.73852E-04
8	0.00000E+00	8.81363E-04	9.03610E-04	9.26357E-04	9.49848E-04	9.73852E-04	9.98344E-04	1.02383E-03	1.04984E-03	1.07633E-03
9	0.00000E+00	9.73852E-04	9.98344E-04	1.02383E-03	1.04984E-03	1.07633E-03	1.10358E-03	1.13157E-03	1.16032E-03	1.18957E-03
10	0.00000E+00	1.07633E-03	1.10358E-03	1.13157E-03	1.16032E-03	1.18957E-03	1.21956E-03	1.25055E-03	1.28230E-03	1.31455E-03

	11	12	13	14	15	16	17	18	19	20
1	5.47911E-04	5.61913E-04	5.76159E-04	5.90661E-04	6.05651E-04	6.21153E-04	6.36900E-04	6.52902E-04	6.69392E-04	6.86395E-04
2	6.05651E-04	6.21153E-04	6.36900E-04	6.52902E-04	6.69392E-04	6.86395E-04	7.03641E-04	7.21388E-04	7.39634E-04	7.58381E-04
3	6.69392E-04	6.86395E-04	7.03641E-04	7.21388E-04	7.39634E-04	7.58381E-04	7.77628E-04	7.97375E-04	8.17622E-04	8.38369E-04
4	7.39634E-04	7.58381E-04	7.77628E-04	7.97375E-04	8.17622E-04	8.38369E-04	8.59616E-04	8.81363E-04	9.03610E-04	9.26357E-04
5	8.17622E-04	8.38369E-04	8.59616E-04	8.81363E-04	9.03610E-04	9.26357E-04	9.49848E-04	9.73852E-04	9.98344E-04	1.02383E-03
6	9.03610E-04	9.26357E-04	9.49848E-04	9.73852E-04	9.98344E-04	1.02383E-03	1.04984E-03	1.07633E-03	1.10358E-03	1.13157E-03
7	9.98344E-04	1.02383E-03	1.04984E-03	1.07633E-03	1.10358E-03	1.13157E-03	1.16032E-03	1.18957E-03	1.21956E-03	1.25055E-03
8	1.10358E-03	1.13157E-03	1.16032E-03	1.18957E-03	1.21956E-03	1.25055E-03	1.28230E-03	1.31455E-03	1.34779E-03	1.38203E-03
9	1.21956E-03	1.25055E-03	1.28230E-03	1.31455E-03	1.34779E-03	1.38203E-03	1.41703E-03	1.45278E-03	1.48951E-03	1.52726E-03
10	1.34779E-03	1.38203E-03	1.41703E-03	1.45278E-03	1.48951E-03	1.52726E-03	1.56600E-03	1.60575E-03	1.64624E-03	1.68798E-03

	21	22	23	24	25	26	27	28	29	30
1	7.03641E-04	7.21388E-04	7.39634E-04	7.58381E-04	7.77628E-04	7.97375E-04	8.17622E-04	8.38369E-04	8.59616E-04	8.81363E-04
2	7.77628E-04	7.97375E-04	8.17622E-04	8.38369E-04	8.59616E-04	8.81363E-04	9.03610E-04	9.26357E-04	9.49848E-04	9.73852E-04
3	8.59616E-04	8.81363E-04	9.03610E-04	9.26357E-04	9.49848E-04	9.73852E-04	9.98344E-04	1.02383E-03	1.04984E-03	1.07633E-03
4	9.49848E-04	9.73852E-04	9.98344E-04	1.02383E-03	1.04984E-03	1.07633E-03	1.10358E-03	1.13157E-03	1.16032E-03	1.18957E-03
5	1.04984E-03	1.07633E-03	1.10358E-03	1.13157E-03	1.16032E-03	1.18957E-03	1.21956E-03	1.25055E-03	1.28230E-03	1.31455E-03
6	1.16032E-03	1.18957E-03	1.21956E-03	1.25055E-03	1.28230E-03	1.31455E-03	1.34779E-03	1.38203E-03	1.41703E-03	1.45278E-03
7	1.28230E-03	1.31455E-03	1.34779E-03	1.38203E-03	1.41703E-03	1.45278E-03	1.48951E-03	1.52726E-03	1.56600E-03	1.60575E-03
8	1.41703E-03	1.45278E-03	1.48951E-03	1.52726E-03	1.56600E-03	1.60575E-03	1.64624E-03	1.68798E-03	1.73073E-03	1.77447E-03
9	1.56600E-03	1.60575E-03	1.64624E-03	1.68798E-03	1.73073E-03	1.77447E-03	1.81947E-03	1.86546E-03	1.91270E-03	1.96119E-03
10	1.73073E-03	1.77447E-03	1.81947E-03	1.86546E-03	1.91270E-03	1.96119E-03	2.01093E-03	2.06193E-03	2.11392E-03	2.16741E-03

	31	32	33	34	35	36	37	38	39	40
1	9.03610E-04	9.26357E-04	9.49848E-04	9.73852E-04	9.98344E-04	1.02383E-03	1.04984E-03	1.07633E-03	1.10358E-03	1.13157E-03
2	9.98344E-04	1.02383E-03	1.04984E-03	1.07633E-03	1.10358E-03	1.13157E-03	1.16032E-03	1.18957E-03	1.21956E-03	1.25055E-03
3	1.10358E-03	1.13157E-03	1.16032E-03	1.18957E-03	1.21956E-03	1.25055E-03	1.28230E-03	1.31455E-03	1.34779E-03	1.38203E-03
4	1.21956E-03	1.25055E-03	1.28230E-03	1.31455E-03	1.34779E-03	1.38203E-03	1.41703E-03	1.45278E-03	1.48951E-03	1.52726E-03
5	1.34779E-03	1.38203E-03	1.41703E-03	1.45278E-03	1.48951E-03	1.52726E-03	1.56600E-03	1.60575E-03	1.64624E-03	1.68798E-03
6	1.48951E-03	1.52726E-03	1.56600E-03	1.60575E-03	1.64624E-03	1.68798E-03	1.73073E-03	1.77447E-03	1.81947E-03	1.86546E-03
7	1.64624E-03	1.68798E-03	1.73073E-03	1.77447E-03	1.81947E-03	1.86546E-03	1.91270E-03	1.96119E-03	2.01093E-03	2.06193E-03
8	1.81947E-03	1.86546E-03	1.91270E-03	1.96119E-03	2.01093E-03	2.06193E-03	2.11392E-03	2.16741E-03	2.22240E-03	2.27864E-03

9	2.01093E-03	2.06193E-03	2.11392E-03	2.16741E-03	2.22240E-03	2.27864E-03	2.33638E-03	2.39538E-03	2.45587E-03	2.51811E-03
10	2.22240E-03	2.27864E-03	2.33638E-03	2.39538E-03	2.45587E-03	2.51811E-03	2.58185E-03	2.64733E-03	2.71433E-03	2.78282E-03

GLOBAL Z-DIRECTION TRANSMISSIVITY (SQ.M/SEC)

....

All values for this array equal 0.0000E+00

GRID BLOCK CENTER ELEVATION ABOVE DATUM PLANE (M)
(Measured positive upwards)

....

	1	2	3	4	5	6	7	8	9	10
1	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000
2	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000
3	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
4	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
5	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000
6	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
7	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000
8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
9	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000
10	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

	11	12	13	14	15	16	17	18	19	20
1	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000
2	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000
3	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000

4	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
5	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000
6	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
7	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000
8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
9	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000
10	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

	21	22	23	24	25	26	27	28	29	30
1	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000
2	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000
3	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
4	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
5	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000
6	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
7	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000
8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
9	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000
10	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

	31	32	33	34	35	36	37	38	39	40
1	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000	4.5000
2	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000	4.0000
3	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000	3.5000
4	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000
5	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000	2.5000
6	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000	2.0000
7	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000	1.5000
8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
9	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000	0.50000
10	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00

GRID BLOCK THICKNESS (M)

....

All values for this array equal 0.5000

INITIAL GLOBAL PRESSURE AT ELEVATION H (PA)

....

	1	2	3	4	5	6	7	8	9	10
1	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8
2	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3
3	12259.	12259.	12259.	12259.	12259.	12259.	12259.	12259.	12259.	12259.
4	17162.	17162.	17162.	17162.	17162.	17162.	17162.	17162.	17162.	17162.
5	22066.	22066.	22066.	22066.	22066.	22066.	22066.	22066.	22066.	22066.
6	26969.	26969.	26969.	26969.	26969.	26969.	26969.	26969.	26969.	26969.
7	31873.	31873.	31873.	31873.	31873.	31873.	31873.	31873.	31873.	31873.
8	36776.	36776.	36776.	36776.	36776.	36776.	36776.	36776.	36776.	36776.
9	41680.	41680.	41680.	41680.	41680.	41680.	41680.	41680.	41680.	41680.
10	46583.	46583.	46583.	46583.	46583.	46583.	46583.	46583.	46583.	46583.

	11	12	13	14	15	16	17	18	19	20
1	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8
2	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3
3	12259.	12259.	12259.	12259.	12259.	12259.	12259.	12259.	12259.	12259.
4	17162.	17162.	17162.	17162.	17162.	17162.	17162.	17162.	17162.	17162.
5	22066.	22066.	22066.	22066.	22066.	22066.	22066.	22066.	22066.	22066.
6	26969.	26969.	26969.	26969.	26969.	26969.	26969.	26969.	26969.	26969.
7	31873.	31873.	31873.	31873.	31873.	31873.	31873.	31873.	31873.	31873.
8	36776.	36776.	36776.	36776.	36776.	36776.	36776.	36776.	36776.	36776.
9	41680.	41680.	41680.	41680.	41680.	41680.	41680.	41680.	41680.	41680.
10	46583.	46583.	46583.	46583.	46583.	46583.	46583.	46583.	46583.	46583.

	21	22	23	24	25	26	27	28	29	30
1	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8
2	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3
3	12259.	12259.	12259.	12259.	12259.	12259.	12259.	12259.	12259.	12259.
4	17162.	17162.	17162.	17162.	17162.	17162.	17162.	17162.	17162.	17162.
5	22066.	22066.	22066.	22066.	22066.	22066.	22066.	22066.	22066.	22066.
6	26969.	26969.	26969.	26969.	26969.	26969.	26969.	26969.	26969.	26969.
7	31873.	31873.	31873.	31873.	31873.	31873.	31873.	31873.	31873.	31873.
8	36776.	36776.	36776.	36776.	36776.	36776.	36776.	36776.	36776.	36776.
9	41680.	41680.	41680.	41680.	41680.	41680.	41680.	41680.	41680.	41680.
10	46583.	46583.	46583.	46583.	46583.	46583.	46583.	46583.	46583.	46583.

	31	32	33	34	35	36	37	38	39	40
1	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8	2451.8
2	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3	7355.3
3	12259.	12259.	12259.	12259.	12259.	12259.	12259.	12259.	12259.	12259.
4	17162.	17162.	17162.	17162.	17162.	17162.	17162.	17162.	17162.	17162.
5	22066.	22066.	22066.	22066.	22066.	22066.	22066.	22066.	22066.	22066.
6	26969.	26969.	26969.	26969.	26969.	26969.	26969.	26969.	26969.	26969.
7	31873.	31873.	31873.	31873.	31873.	31873.	31873.	31873.	31873.	31873.
8	36776.	36776.	36776.	36776.	36776.	36776.	36776.	36776.	36776.	36776.
9	41680.	41680.	41680.	41680.	41680.	41680.	41680.	41680.	41680.	41680.
10	46583.	46583.	46583.	46583.	46583.	46583.	46583.	46583.	46583.	46583.

INITIAL GLOBAL PRESSURE AT DATUM ELEVATION (PA)

....

All values for this array equal 4.6583E+04

INITIAL GLOBAL TEMPERATURES (DEG.C)

....

All values for this array equal   21.10

INITIAL GLOBAL BRINE CONCENTRATIONS (FRACTION)

....

All values for this array equal 0.0000E+00

```
*** STATE VARIABLE INITIALIZATION ***
--------------------------------------


 AMOUNT IN-PLACE
 ...............
 WATER   20000.     (KG)
 ENERGY  1.76916E+09 (J)
 BRINE  0.00000E+00 (KG)
```

```
*** RECURRENT DATA SPECIFICATION BEGINNING AT TIME =  0.0000E+00 (SECS)  ***
--------------------------------------------------------------------------

                  INPUT CONTROL OPTIONS
 ..................................................
 INDQ IWELL IMETH ITHRU IRSS IPROD IOPT INDT ICLL IRCH ICHCR
 ..................................................
  0    0    1    0    0    0    0    0    0    0    0

                 METHOD =-1       WT FACTOR =  1.0

 NOTE: FOR DIRECT D4 SOLUTION, THE A-ARRAY (G3)IN LABELLED COMMON GAMMA
     IS DIMENSIONED AT  700000 WORDS  BUT REQUIRES ONLY   12401 WORDS


              TIME STEPPING AND OUTPUT CONTROL OPTIONS
 ..........................................................................
   TCHG      DT  IO1  IO2  IO3  IO4  IO5  IO6  IO8  RSTWR  MAP  MDAT  IIPRT  IO5D  IO8D  IIPRTD
 ..........................................................................

0.000E+00 0.000E+00  0  0  1  0  0  0  0  0  0  0  1  0  -1  0
 PRESSURE EQUATION AFTER OUTER ITERATION NO.   1      RELATIVE CHANGE IS 0.9776
```

ELAPSED SIMULATION TIME 0.0000E+00 (SECS)
****

GLOBAL X-DIR - DARCY VELOCITY (M/SEC)
....

	1	2	3	4	5	6	7	8	9	10
1	0.00000E+00	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04
2	0.00000E+00	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04
3	0.00000E+00	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04
4	0.00000E+00	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04
5	0.00000E+00	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04
6	0.00000E+00	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04
7	0.00000E+00	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04
8	0.00000E+00	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04
9	0.00000E+00	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04
10	0.00000E+00	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04

	11	12	13	14	15	16	17	18	19	20
1	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04
2	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04
3	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04
4	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04
5	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04
6	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04
7	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04
8	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04
9	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04
10	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04

	21	22	23	24	25	26	27	28	29	30
1	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04
2	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04
3	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04
4	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04
5	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04
6	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04
7	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04
8	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04
9	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04
10	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04

	31	32	33	34	35	36	37	38	39	40
1	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04	3.37717E-04
2	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04	3.73236E-04
3	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04	4.12488E-04
4	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04	4.55873E-04
5	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04	5.03811E-04
6	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04	5.56787E-04
7	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04	6.15359E-04
8	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04	6.80068E-04
9	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04	7.51581E-04
10	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04	8.30630E-04

GLOBAL Z-DIR - DARCY VELOCITY (M/SEC)

....

All values for this array equal 0.0000E+00

```
--------------------------------------------------------------------------------

  ELAPSED SIMULATION TIME  0.0000E+00 SECS  ( 0.0000E+00 DAYS   , 0.0000E+00 YEARS )
 ***************************************************************************************

TIME STEP NUMBER    1   NUMBER OF OUTER ITERATIONS   1    CURRENT TIME STEP  1.000    SECS

   *STEADY STATE*        FLUID (KG/SEC)    ENERGY (J/SEC)    BRINE (KG/SEC)
                     ..............  ..............  ..............
(GLOBAL+LOCAL)  MASS OR HEAT BALANCE        1.0000         *******         *******
        AQUIFER-INFLUENCE FUNCTION
         TOTAL INFLUX (+)         1.379          0.0000E+00       0.0000E+00
         TOTAL EFFLUX (-)         1.379          0.0000E+00       0.0000E+00
         CUMULATIVE FLUX         -3.5583E-14       0.0000E+00       0.0000E+00

        TOTAL IN PLACE           20000.    (KG)    1.76916E+09 (J)    0.00000E+00 (KG)

        MAXIMUM CHANGE AT BLK      ( 1, 1,10)        ( 40, 1,10)        ( 40, 1,10)
         OVER LAST TIME STEP       1.5353E+05 (PA)    0.0000E+00(DEG.C)  0.0000E+00

        AVERAGE PRESSURE  1.2594E+05 (PA)     HEAT LOSS TO OVER/UNDRBRDN  0.0000E+00 (J)


                  *** GLOBAL (FRACTURE) DEPENDENT VALUES ***
                  ------------------------------------------


                   GLOBAL PRESSURE AT ELEVATION (PA)
                   .................................

     1      2      3      4      5      6      7      8      9     10
```

1	1.09394E+05	1.07502E+05	1.05656E+05	1.03857E+05	1.02101E+05	1.00389E+05	98719.	97090.	95502.	93953.
2	1.14298E+05	1.12406E+05	1.10560E+05	1.08760E+05	1.07005E+05	1.05293E+05	1.03623E+05	1.01994E+05	1.00406E+05	98857.
3	1.19202E+05	1.17309E+05	1.15464E+05	1.13664E+05	1.11909E+05	1.10196E+05	1.08527E+05	1.06899E+05	1.05311E+05	1.03762E+05
4	1.24106E+05	1.22214E+05	1.20368E+05	1.18569E+05	1.16814E+05	1.15102E+05	1.13432E+05	1.11804E+05	1.10216E+05	1.08666E+05
5	1.29010E+05	1.27118E+05	1.25273E+05	1.23473E+05	1.21718E+05	1.20006E+05	1.18336E+05	1.16707E+05	1.15118E+05	1.13569E+05
6	1.33914E+05	1.32022E+05	1.30176E+05	1.28376E+05	1.26620E+05	1.24908E+05	1.23239E+05	1.21610E+05	1.20022E+05	1.18474E+05
7	1.38818E+05	1.36926E+05	1.35081E+05	1.33281E+05	1.31526E+05	1.29814E+05	1.28145E+05	1.26516E+05	1.24928E+05	1.23378E+05
8	1.43722E+05	1.41830E+05	1.39985E+05	1.38185E+05	1.36430E+05	1.34718E+05	1.33048E+05	1.31419E+05	1.29831E+05	1.28282E+05
9	1.48626E+05	1.46734E+05	1.44888E+05	1.43088E+05	1.41333E+05	1.39621E+05	1.37951E+05	1.36323E+05	1.34735E+05	1.33186E+05
10	1.53530E+05	1.51638E+05	1.49793E+05	1.47993E+05	1.46238E+05	1.44526E+05	1.42856E+05	1.41227E+05	1.39639E+05	1.38090E+05

	11	12	13	14	15	16	17	18	19	20
1	92442.	90968.	89531.	88130.	86762.	85429.	84129.	82861.	81624.	80418.
2	97346.	95873.	94436.	93034.	91667.	90334.	89034.	87765.	86528.	85321.
3	1.02251E+05	1.00778E+05	99340.	97938.	96571.	95238.	93937.	92669.	91432.	90225.
4	1.07155E+05	1.05681E+05	1.04244E+05	1.02842E+05	1.01475E+05	1.00142E+05	98842.	97574.	96337.	95130.
5	1.12058E+05	1.10585E+05	1.09148E+05	1.07747E+05	1.06380E+05	1.05046E+05	1.03746E+05	1.02477E+05	1.01240E+05	1.00034E+05
6	1.16963E+05	1.15489E+05	1.14052E+05	1.12650E+05	1.11283E+05	1.09950E+05	1.08649E+05	1.07381E+05	1.06144E+05	1.04938E+05
7	1.21867E+05	1.20393E+05	1.18956E+05	1.17555E+05	1.16188E+05	1.14854E+05	1.13554E+05	1.12286E+05	1.11049E+05	1.09842E+05
8	1.26771E+05	1.25297E+05	1.23860E+05	1.22459E+05	1.21092E+05	1.19758E+05	1.18458E+05	1.17190E+05	1.15952E+05	1.14746E+05
9	1.31675E+05	1.30201E+05	1.28764E+05	1.27362E+05	1.25995E+05	1.24662E+05	1.23362E+05	1.22093E+05	1.20856E+05	1.19650E+05
10	1.36579E+05	1.35106E+05	1.33668E+05	1.32267E+05	1.30899E+05	1.29566E+05	1.28265E+05	1.26997E+05	1.25760E+05	1.24554E+05

	21	22	23	24	25	26	27	28	29	30
1	79241.	78093.	76974.	75882.	74817.	73779.	72766.	71779.	70815.	69876.
2	84145.	82997.	81878.	80786.	79722.	78684.	77671.	76683.	75720.	74780.
3	89049.	87902.	86782.	85691.	84626.	83587.	82574.	81587.	80623.	79684.
4	93954.	92806.	91686.	90595.	89530.	88492.	87479.	86491.	85528.	84588.
5	98857.	97710.	96590.	95499.	94434.	93396.	92383.	91395.	90432.	89492.
6	1.03761E+05	1.02614E+05	1.01494E+05	1.00403E+05	99338.	98300.	97287.	96299.	95336.	94396.
7	1.08666E+05	1.07518E+05	1.06399E+05	1.05307E+05	1.04242E+05	1.03204E+05	1.02191E+05	1.01203E+05	1.00240E+05	99300.
8	1.13569E+05	1.12422E+05	1.11302E+05	1.10210E+05	1.09146E+05	1.08107E+05	1.07095E+05	1.06107E+05	1.05143E+05	1.04204E+05
9	1.18473E+05	1.17325E+05	1.16206E+05	1.15114E+05	1.14050E+05	1.13011E+05	1.11998E+05	1.11011E+05	1.10047E+05	1.09108E+05
10	1.23377E+05	1.22229E+05	1.21110E+05	1.20018E+05	1.18954E+05	1.17915E+05	1.16903E+05	1.15915E+05	1.14952E+05	1.14012E+05

	31	32	33	34	35	36	37	38	39	40
1	68960.	68066.	67194.	66344.	65515.	64706.	63917.	63148.	62398.	61666.
2	73863.	72970.	72098.	71248.	70419.	69610.	68821.	68052.	67302.	66570.
3	78767.	77874.	77002.	76152.	75323.	74514.	73725.	72956.	72206.	71474.
4	83672.	82778.	81906.	81056.	80227.	79418.	78629.	77860.	77110.	76378.
5	88576.	87682.	86810.	85960.	85131.	84322.	83533.	82764.	82014.	81282.
6	93480.	92586.	91714.	90864.	90035.	89226.	88437.	87668.	86918.	86186.
7	98384.	97490.	96618.	95768.	94939.	94130.	93341.	92572.	91822.	91090.
8	1.03287E+05	1.02394E+05	1.01522E+05	1.00672E+05	99843.	99034.	98245.	97476.	96726.	95994.
9	1.08191E+05	1.07298E+05	1.06426E+05	1.05576E+05	1.04747E+05	1.03938E+05	1.03149E+05	1.02380E+05	1.01630E+05	1.00898E+05
10	1.13096E+05	1.12202E+05	1.11330E+05	1.10480E+05	1.09651E+05	1.08842E+05	1.08053E+05	1.07284E+05	1.06534E+05	1.05802E+05

GLOBAL PRESSURE AT DATUM (PA)
....

	1	2	3	4	5	6	7	8	9	10
1	1.53525E+05	1.51633E+05	1.49788E+05	1.47988E+05	1.46233E+05	1.44521E+05	1.42851E+05	1.41222E+05	1.39634E+05	1.38085E+05
2	1.53526E+05	1.51634E+05	1.49788E+05	1.47988E+05	1.46233E+05	1.44521E+05	1.42851E+05	1.41222E+05	1.39634E+05	1.38085E+05
3	1.53526E+05	1.51634E+05	1.49788E+05	1.47988E+05	1.46233E+05	1.44521E+05	1.42851E+05	1.41223E+05	1.39635E+05	1.38086E+05
4	1.53527E+05	1.51635E+05	1.49789E+05	1.47990E+05	1.46235E+05	1.44523E+05	1.42853E+05	1.41225E+05	1.39637E+05	1.38087E+05
5	1.53528E+05	1.51636E+05	1.49790E+05	1.47991E+05	1.46235E+05	1.44523E+05	1.42853E+05	1.41224E+05	1.39636E+05	1.38087E+05
6	1.53528E+05	1.51636E+05	1.49790E+05	1.47990E+05	1.46234E+05	1.44522E+05	1.42853E+05	1.41224E+05	1.39636E+05	1.38088E+05
7	1.53528E+05	1.51636E+05	1.49791E+05	1.47992E+05	1.46236E+05	1.44525E+05	1.42855E+05	1.41226E+05	1.39638E+05	1.38089E+05
8	1.53529E+05	1.51637E+05	1.49792E+05	1.47992E+05	1.46237E+05	1.44525E+05	1.42855E+05	1.41226E+05	1.39638E+05	1.38089E+05
9	1.53529E+05	1.51637E+05	1.49792E+05	1.47992E+05	1.46237E+05	1.44524E+05	1.42855E+05	1.41226E+05	1.39638E+05	1.38089E+05
10	1.53530E+05	1.51638E+05	1.49793E+05	1.47993E+05	1.46238E+05	1.44526E+05	1.42856E+05	1.41227E+05	1.39639E+05	1.38090E+05

11	12	13	14	15	16	17	18	19	20

1	1.36573E+05	1.35100E+05	1.33663E+05	1.32261E+05	1.30894E+05	1.29561E+05	1.28261E+05	1.26993E+05	1.25756E+05	1.24549E+05
2	1.36574E+05	1.35101E+05	1.33664E+05	1.32262E+05	1.30895E+05	1.29562E+05	1.28262E+05	1.26993E+05	1.25756E+05	1.24549E+05
3	1.36575E+05	1.35102E+05	1.33665E+05	1.32263E+05	1.30896E+05	1.29562E+05	1.28261E+05	1.26993E+05	1.25756E+05	1.24550E+05
4	1.36576E+05	1.35102E+05	1.33665E+05	1.32263E+05	1.30896E+05	1.29563E+05	1.28263E+05	1.26995E+05	1.25758E+05	1.24551E+05
5	1.36576E+05	1.35103E+05	1.33666E+05	1.32264E+05	1.30897E+05	1.29564E+05	1.28263E+05	1.26995E+05	1.25758E+05	1.24551E+05
6	1.36577E+05	1.35103E+05	1.33666E+05	1.32264E+05	1.30897E+05	1.29564E+05	1.28263E+05	1.26995E+05	1.25758E+05	1.24552E+05
7	1.36578E+05	1.35104E+05	1.33667E+05	1.32265E+05	1.30898E+05	1.29565E+05	1.28265E+05	1.26996E+05	1.25759E+05	1.24553E+05
8	1.36578E+05	1.35104E+05	1.33667E+05	1.32266E+05	1.30899E+05	1.29565E+05	1.28265E+05	1.26997E+05	1.25759E+05	1.24553E+05
9	1.36578E+05	1.35105E+05	1.33668E+05	1.32266E+05	1.30899E+05	1.29565E+05	1.28265E+05	1.26997E+05	1.25760E+05	1.24553E+05
10	1.36579E+05	1.35106E+05	1.33668E+05	1.32267E+05	1.30899E+05	1.29566E+05	1.28265E+05	1.26997E+05	1.25760E+05	1.24554E+05

	21	22	23	24	25	26	27	28	29	30
1	1.23373E+05	1.22225E+05	1.21105E+05	1.20014E+05	1.18949E+05	1.17910E+05	1.16898E+05	1.15910E+05	1.14947E+05	1.14008E+05
2	1.23373E+05	1.22225E+05	1.21106E+05	1.20014E+05	1.18950E+05	1.17912E+05	1.16899E+05	1.15911E+05	1.14948E+05	1.14008E+05
3	1.23374E+05	1.22226E+05	1.21107E+05	1.20015E+05	1.18950E+05	1.17912E+05	1.16899E+05	1.15911E+05	1.14948E+05	1.14008E+05
4	1.23375E+05	1.22227E+05	1.21107E+05	1.20016E+05	1.18951E+05	1.17913E+05	1.16900E+05	1.15912E+05	1.14949E+05	1.14009E+05
5	1.23375E+05	1.22227E+05	1.21108E+05	1.20016E+05	1.18952E+05	1.17913E+05	1.16900E+05	1.15913E+05	1.14949E+05	1.14010E+05
6	1.23375E+05	1.22228E+05	1.21108E+05	1.20017E+05	1.18952E+05	1.17914E+05	1.16901E+05	1.15913E+05	1.14950E+05	1.14010E+05
7	1.23376E+05	1.22228E+05	1.21109E+05	1.20017E+05	1.18953E+05	1.17914E+05	1.16901E+05	1.15913E+05	1.14950E+05	1.14011E+05
8	1.23376E+05	1.22229E+05	1.21109E+05	1.20017E+05	1.18953E+05	1.17914E+05	1.16902E+05	1.15914E+05	1.14950E+05	1.14011E+05
9	1.23376E+05	1.22229E+05	1.21109E+05	1.20018E+05	1.18953E+05	1.17915E+05	1.16902E+05	1.15914E+05	1.14951E+05	1.14011E+05
10	1.23377E+05	1.22229E+05	1.21110E+05	1.20018E+05	1.18954E+05	1.17915E+05	1.16903E+05	1.15915E+05	1.14952E+05	1.14012E+05

	31	32	33	34	35	36	37	38	39	40
1	1.13091E+05	1.12197E+05	1.11326E+05	1.10475E+05	1.09646E+05	1.08837E+05	1.08049E+05	1.07279E+05	1.06529E+05	1.05797E+05
2	1.13091E+05	1.12198E+05	1.11326E+05	1.10476E+05	1.09647E+05	1.08838E+05	1.08049E+05	1.07280E+05	1.06530E+05	1.05798E+05
3	1.13092E+05	1.12198E+05	1.11327E+05	1.10476E+05	1.09647E+05	1.08838E+05	1.08050E+05	1.07280E+05	1.06530E+05	1.05798E+05
4	1.13093E+05	1.12199E+05	1.11327E+05	1.10477E+05	1.09648E+05	1.08839E+05	1.08050E+05	1.07281E+05	1.06531E+05	1.05799E+05
5	1.13093E+05	1.12199E+05	1.11328E+05	1.10478E+05	1.09648E+05	1.08839E+05	1.08051E+05	1.07281E+05	1.06531E+05	1.05799E+05
6	1.13094E+05	1.12200E+05	1.11328E+05	1.10478E+05	1.09649E+05	1.08840E+05	1.08051E+05	1.07282E+05	1.06532E+05	1.05800E+05
7	1.13094E+05	1.12200E+05	1.11329E+05	1.10478E+05	1.09649E+05	1.08840E+05	1.08052E+05	1.07282E+05	1.06532E+05	1.05800E+05
8	1.13094E+05	1.12201E+05	1.11329E+05	1.10479E+05	1.09650E+05	1.08841E+05	1.08052E+05	1.07283E+05	1.06533E+05	1.05801E+05
9	1.13095E+05	1.12201E+05	1.11329E+05	1.10479E+05	1.09650E+05	1.08841E+05	1.08053E+05	1.07283E+05	1.06533E+05	1.05801E+05
10	1.13096E+05	1.12202E+05	1.11330E+05	1.10480E+05	1.09651E+05	1.08842E+05	1.08053E+05	1.07284E+05	1.06534E+05	1.05802E+05

GLOBAL TEMPERATURE (DEG.C)

....

All values for this array equal 21.10

GLOBAL BRINE CONCENTRATION (FRACTION)

....

All values for this array equal 0.0000E+00

AQUIFER INFLUX RATES (POSITIVE-IN : NEGATIVE-OUT)

....

```
INFLUENCE BLK NO      1          2          3          4          5          6          7          8          9
BLOCK (I,J,K)    ( 1, 1, 1)( 1, 1, 2)( 1, 1, 3)( 1, 1, 4)( 1, 1, 5)( 1, 1, 6)( 1, 1, 7)( 1, 1, 8)( 1, 1, 9)
FLUID (KG/SEC)   8.443E-02  9.331E-02  1.031E-01  1.140E-01  1.260E-01  1.392E-01  1.538E-01  1.700E-01  1.879E-01

INFLUENCE BLK NO      10         11         12         13         14         15         16         17         18
BLOCK (I,J,K)    ( 1, 1,10)(40, 1, 1)(40, 1, 2)(40, 1, 3)(40, 1, 4)(40, 1, 5)(40, 1, 6)(40, 1, 7)(40, 1, 8)
FLUID (KG/SEC)   2.077E-01 -8.443E-02 -9.331E-02 -1.031E-01 -1.140E-01 -1.260E-01 -1.392E-01 -1.538E-01 -1.700E-01

INFLUENCE BLK NO      19         20
BLOCK (I,J,K)    (40, 1, 9)(40, 1,10)(
FLUID (KG/SEC)  -1.879E-01 -2.077E-01
```

```
NORMAL TERMINATION   (ITIME =    1 ; TIME = 0.0000E+00 )
        CPU elapsed time =  7.857     seconds
```

```
PROB. 4. 0 (MR) ++ FLOW VERIFICATION - ENGLISH ENGR. - RADIAL COORDS
FULLY PENETRATING WELL WITH CONSTANT DRAWDOWN (Beljin, 1991)
  2  0  0  0  1  0  0  1  0  0000                          M-2
 100 1  1  3  0  1  0  1  0  1  0  0  00                    M-3-1
  0  0  0  0                                                M-3-2
0.     0.0     0.     1.     1.                             R1-1
1.     1.      1.     1.     .3     .3     1.E-50           R1-2
120.  0.0      21.1    999.5    999.5                       R1-3
  0  0  0  2                                                R1-6
21.1   .001    21.1    .001                                 R1-7
0.     21.1                                                 R1-11
3.048     21.1                                              R1-11
  0  0                                                      R1-12
21.1  0.0     0.     0.                                     R1-16
0.1143 .4755   50.    0.                                    R1-22
3.048    3.281E-4 3.281E-4   0.25   0.0                     R1-23
 000000                                                     R1-26-BLNK
  4  0                                                      R1-27
  100 100 1 1 1 1 0
  2. 0. 21.1 0. 21.1 0.
  0000000 0
000000
  0  0  0                                                   I-1
0.                                                          R1A-2
  2  1  1  0  0  0  0  0  0  00                             R2-1
  1  .5                                                     R2-2
  2                                                         R2-4
  1 -2.89E-4                                                R2-6
  2  0.                                                     R2-6
  00                                                        R2-6-BLNK
  1  1  1  1  1  1                                          R2-7-1
 1.0     0.0      21.1     1.                               R2-7-2
  2  51  1  1  1  1                                         R2-7-1
 1.0     0.0    21.1    0.                                  R2-7-2
 000000                                                     R2-7-BLNK
0.432E+6  0.432E+5  000000                                  R2-12
  -1 -1 -1 -1 -1 -1 00000000                                R2-13
  0  0  0  0  0  0  0  0  0  0  00                          R2-1
1.728E+6 0.432E+5 0. 0. 6.89E+04  0.  1.728E+06 4.32E+04    R2-12
  -1  -1  1  -1  -1  1 00000 000                            R2-13
  0  0  0  1  0  0  0  0  0  00                             R2-1-STOP
```

```
  2   observation WELL (R =  M)                                P-2
0.     2.592E+6   0.  0.      0.00     0.       0.              P-3-1
0.     0.       0.       0.       0.       1.                  P-3-2
864.    5.973E04  0.       0.       0.       0.                P-4
-100.   0.       0.       0.       0.       0.                 P-END
  0                                                            P-STOP
```

```
**************************************************
*                                                *
*   >>> SWIFT/486 <<<                            *
*                                                *
**************************************************
*                                                *
*        SANDIA Waste-Isolation                  *
*        Flow and Transport in                   *
*      Porous and/or Fractured Media             *
*                                                *
*     Quality Assurance Version 2.53             *
*                                                *
*       --- Transport Equations ---              *
* Fluid free-water surface (steady or transient) *
*     Energy-temperature (transient)             *
* Dominant specie-brine (steady or transient)    *
*   Trace species-radionuclides (transient)      *
*                                                *
*         --- Code evolution ---                 *
*    Intera Technologies, Inc. 1975-1982         *
*        GeoTrans, Inc. 1982-1993                *
*                                                *
*      Copyright GeoTrans, Inc. 1993             *
*                                                *
**************************************************
```

```
*** TITLE CARDS ***
-------------------

**********************************************************************************
*                                                                                *
* PROB. 4.0 (MR) ++ FLOW VERIFICATION - ENGLISH ENGR. - RADIAL COORDS            *
*                                                                                *
* FULLY PENETRATING WELL WITH CONSTANT DRAWDOWN (Beljin, 1991)                   *
*                                                                                *
**********************************************************************************

*** INTEGER CONTROL SPECIFICATION ***
-------------------------------------

*** EXECUTION CONTROL OPTIONS ***
EQUATIONS SOLVING INDEX ............. NCALL.  2
RESTART RECORD NUMBER ............... RSTST..000E+00
WELLBORE DATA KEY ................... ISURF.  0
FREE WATER SURFACE OPTION ........... IFREE.  0
PLOTTING KEYS - PRESSURE ............ NPLP .  1
         - TEMPERATURE ......... NPLT .  0
         - CONCENTRATION ....... NPLC .  0
UNITS ARE IN (0=ENGLISH, 1=METRIC) .. IUNIT.  1
NUCLIDE MONITOR (UNIT9) OPTION ...... LBIO .  0
MAP[ij] {j: 0=NO,1=ASCII,2=BINARY) .. LMAPIT  0
     {i: 0=Datum, 1=Envr H, 2=Fresh Wat H}
MASS BALANCE AUXILIARY FILE (UNIT17). LMBAL   0
AQUIFER INFLUENCE FUNC FILE (UNIT18). LAIF .  0
PRINT REQUENCY FOR L2SOR ............ L2SORP  5

*** PROBLEM DIMENSIONS ***
NUMBER OF BLOCKS IN X-DIRECTION ..... NX ... 100
NUMBER OF BLOCKS IN Y-DIRECTION ..... NY ...   1
NUMBER OF BLOCKS IN Z-DIRECTION ..... NZ ...   1
```

INDEX OF RESERVOIR HETEROGENEITY .... HTG .. 3
NO OF RADIOACTIVE COMPONENTS .... NCP .. 0
NUMBER OF ROCK TYPES .... NRT .. 1
OUTPUT CONTROL INDEX .... KOUT . 0
PRINT CONTROL KEY .... PRT .. 1
MAX NO OF RADIOACTIVE SOURCE BLOCKS . NSMAX 0
MAX NO OF AQUIFER INFL FN BLOCKS .... NABLMX 1
MAX NO OF SURFACE RECHARGE BLOCKS ... NRCHMX 0
METHOD OF SOLUTION .... METHOD 0

*** WASTE INVENTORY TABLE ENTRIES ***
NUMBER OF INTERPOLATION TIMES .... NTIME 0
REPOSITORY AREAL HEATING CONTROL .... KHEAT 0
NUMBER OF REPOSITORY BLOCKS .... NREPB 0

*** LOCAL (MATRIX) SUBSYSTEM CONTROL ***
SOLUTION CONTROL .... KSLVD 0
NUMBER OF LOCAL ROCK TYPES .... NRTD . 0
OUTPUT CONTROL KEY .... KOUTD 0

*** UTILIZATION OF COMMON ARRAY STORAGE ***

	BLANK COMMON		LABELLED COMMON				
	REAL	INTEGER	REAL			INTEGER	
			G	G2	G3	IG	TOTAL
CODE DIMENSIONS :	16403	4469	650000	450000	700000	140000	1940000
DATA REQUIREMENTS:	16403	4469	6729	2404	3001	427	12561

```
*** GLOBAL (FRACTURE) AND FLUID DATA ***
WATER COMPRESSIBILITY .............. CW ....  0.00000E+00  (1/PA)
ROCK COMPRESSIBILITY ............... CR ....  0.00000E+00  (1/PA)
WATER THERMAL EXPANSION FACTOR ..... CTW ...  0.00000E+00  (1/DEG.C)
WATER HEAT CAPACITY ................ CPW ...  1.00000E+00  (J/KG-DEG.C)
ROCK HEAT CAPACITY ................. CPR ...  1.00000E+00  (J/CU.M-DEG.C)
MEDIUM THERMAL COND. IN X-DIR ...... UKTX ..  1.00000E+00  (J/M-SEC-DEG.C)
MEDIUM THERMAL COND. IN Y-DIR ...... UKTY ..  1.00000E+00  (J/M-SEC-DEG.C)
MEDIUM THERMAL COND. IN Z-DIR ...... UKTZ ..  1.00000E+00  (J/M-SEC-DEG.C)
LONGITUDINAL DISPERSIVITY FACTOR ... ALPHL..  3.00000E-01  (M)
TRANSVERSE DISPERSIVITY FACTOR ..... ALPHT..  3.00000E-01  (M)
EFFECTIVE MOLECULAR DIFFUSION ...... DMEFF..  1.00000E-50  (SQ.M/SEC)
ROCK DENSITY (SOLID PARTICLE) ...... BROCK..  1.20000E+02  (KG/CU.M)
REF. PRESSURE FOR FLUID DENSITIES .. PBWR ..  0.00000E+00  (PA)
REF. TEMP. FOR FLUID DENSITIES ..... TBWR ..  2.11000E+01  (DEG.C)
FLUID DENSITY (AT C=0.0) ........... BWRN ..  9.99500E+02  (KG/CU.M)
BRINE FLUID DENSITY (AT C=1.0) ..... BWRI ..  9.99500E+02  (KG/CU.M)
```

```
  TEMPERATURE-VISCOSITY TABLE
.......................................
TEMPERATURE (DEG.C)    VISCOSITY (PA-SEC)
.......................................

   AQUIFER FLUID (AT C=0.0)
 2.11000E+01         1.00000E-03

   SATURATED BRINE (AT C=1.0)
 2.11000E+01         1.00000E-03


DEPTH-TEMPERATURE INITIALIZATION
...............................
DEPTH (M)    TEMPERATURE (DEG.C)
...............................

 0.0000E+00       21.10
  3.048       21.10
```

```
 *** REFERENCE CONDITIONS FOR FLUID AND GLOBAL SYSTEM ***
REFERENCE FLUID TEMPERATURE ........ TO ....  2.11000E+01  (DEG.C)
INITIAL AND REFERENCE PRESSURE ..... PINIT   0.00000E+00  (PA)
REFERENCE DEPTH OF INITIAL P & T ... HINIT .  0.00000E+00  (M)
DEPTH FROM REF. PLANE TO DATUM ..... HDATUM   0.00000E+00  (M)
REFERENCE WATER DENSITY (AT C=0.0) . BW0 ...  9.99500E+02  (KG/CU.M)
REFERENCE WATER INTERNAL ENERGY .... UW0 ...  8.84578E+04  (J/KG)
REFERENCE WATER ENTHALPY ........... ETH ...  8.84578E+04  (J/KG)
```

*** CYLINDRICAL GLOBAL SYSTEM DATA ***
WELLBORE RADIUS .... RW .... 0.1143 (M)
RADIUS TO CENTER OF FIRST COLUMN ... R1 .... 0.4755 (M)
RESERVOIR EXTERIOR RADIUS .... RE .... 50.00 (M)
DEPTH TO CENTROID OF BLOCK (1,1,1) . DEPTH . 0.0000E+00 (M)

LAYERED DESCRIPTION

LYR NO.	THICKNESS (M)	KHORZ (M/SEC)	KVERT (M/SEC)	POROSITY FRACTION	ROCK HEAT CAP (J/CU.M-DEG.C)
1	3.05	3.281E-04	3.281E-04	0.250	0.000E+00

RADIAL GRID BLOCK DATA

BLOCK NO.	RADII - (M) CENTER	BOUNDARY
1	0.4755	0.1143
2	0.4983	0.4868
3	0.5221	0.5101
4	0.5472	0.5346
5	0.5734	0.5602
6	0.6008	0.5870
7	0.6296	0.6151
8	0.6598	0.6446
9	0.6914	0.6754
10	0.7245	0.7078
11	0.7592	0.7417
12	0.7955	0.7772

13	0.8336	0.8144
14	0.8736	0.8535
15	0.9154	0.8943
16	0.9593	0.9372
17	1.005	0.9821
18	1.053	1.029
19	1.104	1.078
20	1.157	1.130
21	1.212	1.184
22	1.270	1.241
23	1.331	1.300
24	1.395	1.363
25	1.462	1.428
26	1.532	1.496
27	1.605	1.568
28	1.682	1.643
29	1.762	1.722
30	1.847	1.804
31	1.935	1.891
32	2.028	1.981
33	2.125	2.076
34	2.227	2.176
35	2.334	2.280
36	2.445	2.389
37	2.562	2.503
38	2.685	2.623
39	2.814	2.749
40	2.949	2.881
41	3.090	3.019
42	3.238	3.163
43	3.393	3.315
44	3.555	3.473
45	3.726	3.640
46	3.904	3.814
47	4.091	3.997
48	4.287	4.188
49	4.492	4.389
50	4.708	4.599
51	4.933	4.819
52	5.169	5.050
53	5.417	5.292

54	5.676	5.546
55	5.948	5.811
56	6.233	6.090
57	6.532	6.381
58	6.845	6.687
59	7.173	7.007
60	7.516	7.343
61	7.876	7.695
62	8.253	8.063
63	8.649	8.450
64	9.063	8.854
65	9.497	9.278
66	9.952	9.723
67	10.43	10.19
68	10.93	10.68
69	11.45	11.19
70	12.00	11.72
71	12.58	12.29
72	13.18	12.87
73	13.81	13.49
74	14.47	14.14
75	15.16	14.81
76	15.89	15.52
77	16.65	16.27
78	17.45	17.05
79	18.28	17.86
80	19.16	18.72
81	20.08	19.61
82	21.04	20.55
83	22.05	21.54
84	23.10	22.57
85	24.21	23.65
86	25.37	24.78
87	26.58	25.97
88	27.86	27.22
89	29.19	28.52
90	30.59	29.89
91	32.06	31.32
92	33.59	32.82
93	35.20	34.39
94	36.89	36.04

95	38.65	37.76
96	40.50	39.57
97	42.44	41.47
98	44.48	43.45
99	46.61	45.53
100	48.84	47.71

DEPTH OF BLOCK CENTERS BELOW REFERENCE PLANE (M)
(Measured positive downwards)
....

All values for this array equal 0.0000E+00

GLOBAL BOUNDARY PRESSURES (PA)
....

All values for this array equal 0.0000E+00

GLOBAL BOUNDARY TEMPERATURES (DEG.C)
....

	1	2	3	4	5	6	7	8	9	10
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	11	12	13	14	15	16	17	18	19	20
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	21	22	23	24	25	26	27	28	29	30
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	31	32	33	34	35	36	37	38	39	40
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	41	42	43	44	45	46	47	48	49	50
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	51	52	53	54	55	56	57	58	59	60
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	61	62	63	64	65	66	67	68	69	70
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	71	72	73	74	75	76	77	78	79	80
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	81	82	83	84	85	86	87	88	89	90
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	91	92	93	94	95	96	97	98	99	100

```
1   0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  0.0000  21.1000


          GLOBAL BOUNDARY CONCENTRATIONS (FRACTION)
          ........................................

          All values for this array equal  0.0000E+00



             *** SALT DISSOLUTION ***
             ------------------------

          (PRODUCT OF DISSOLUTION RATE AND SOLUBLE FRACTION)

             ..............................
             ROCK TYPE        PRODUCT
                     (1/SEC)
             ..............................

              1         0.0000E+00


          WARNING - Maximum Peclet number is 2.339E+03
```

GLOBAL PORE VOLUME (M**3)

	1	2	3	4	5	6	7	8	9	10
1	0.53602	5.56468E-02	6.11053E-02	6.70992E-02	7.36811E-02	8.09087E-02	8.88452E-02	9.75602E-02	0.10713	0.11764
	11	12	13	14	15	16	17	18	19	20
1	0.12918	0.14185	0.15576	0.17104	0.18782	0.20624	0.22648	0.24869	0.27309	0.29987
	21	22	23	24	25	26	27	28	29	30
1	0.32929	0.36159	0.39706	0.43601	0.47878	0.52574	0.57731	0.63394	0.69612	0.76441
	31	32	33	34	35	36	37	38	39	40
1	0.83939	0.92173	1.0121	1.1114	1.2204	1.3402	1.4716	1.6160	1.7745	1.9486
	41	42	43	44	45	46	47	48	49	50
1	2.1397	2.3496	2.5801	2.8331	3.1111	3.4162	3.7513	4.1193	4.5234	4.9671
	51	52	53	54	55	56	57	58	59	60

1	5.4543	5.9893	6.5769	7.2220	7.9304	8.7083	9.5625	10.501	11.531	12.662
	61	62	63	64	65	66	67	68	69	70
1	13.904	15.267	16.765	18.410	20.215	22.198	24.376	26.767	29.393	32.276
	71	72	73	74	75	76	77	78	79	80
1	35.442	38.918	42.736	46.928	51.531	56.586	62.137	68.232	74.925	82.275
	81	82	83	84	85	86	87	88	89	90
1	90.345	99.207	108.94	119.62	131.36	144.24	158.39	173.93	190.99	209.73
	91	92	93	94	95	96	97	98	99	100
1	230.30	252.89	277.70	304.94	334.85	367.69	403.76	443.37	486.86	534.62

GLOBAL ROCK TYPES
....

All values for this array equal 1

X-DIRECTION PECLET NO (DELX/ALPHAL)
....

	1	2	3	4	5	6	7	8	9	10
1	2.3448	0.24342	0.26730	0.29352	0.32231	0.35393	0.38865	0.42677	0.46864	0.51460
	11	12	13	14	15	16	17	18	19	20
1	0.56508	0.62051	0.68138	0.74822	0.82161	0.90221	0.99071	1.0879	1.1946	1.3118
	21	22	23	24	25	26	27	28	29	30
1	1.4405	1.5818	1.7369	1.9073	2.0944	2.2998	2.5254	2.7731	3.0452	3.3439
	31	32	33	34	35	36	37	38	39	40
1	3.6719	4.0321	4.4276	4.8619	5.3388	5.8625	6.4376	7.0690	7.7625	8.5239
	41	42	43	44	45	46	47	48	49	50
1	9.3600	10.278	11.286	12.393	13.609	14.944	16.410	18.020	19.787	21.728
	51	52	53	54	55	56	57	58	59	60
1	23.860	26.200	28.770	31.592	34.691	38.094	41.831	45.934	50.440	55.388
	61	62	63	64	65	66	67	68	69	70
1	60.821	66.787	73.338	80.532	88.432	97.106	106.63	117.09	128.58	141.19

	71	72	73	74	75	76	77	78	79	80
1	155.04	170.25	186.95	205.28	225.42	247.53	271.81	298.48	327.76	359.91
	81	82	83	84	85	86	87	88	89	90
1	395.21	433.98	476.55	523.29	574.62	630.99	692.88	760.85	835.48	917.44
	91	92	93	94	95	96	97	98	99	100
1	1007.4	1106.3	1214.8	1333.9	1464.8	1608.5	1766.2	1939.5	2129.7	2338.6

GLOBAL X-DIRECTION TRANSMISSIVITY (SQ.M/SEC)

....

All values for this array equal 0.1343

GRID BLOCK CENTER ELEVATION ABOVE DATUM PLANE (M)
(Measured positive upwards)

....

All values for this array equal 0.0000E+00

GRID BLOCK THICKNESS (M)
....

All values for this array equal 3.048

INITIAL GLOBAL PRESSURE AT ELEVATION H (PA)
....

All values for this array equal 0.0000E+00

INITIAL GLOBAL PRESSURE AT DATUM ELEVATION (PA)
....

All values for this array equal 0.0000E+00

INITIAL GLOBAL TEMPERATURES (DEG.C)
....

All values for this array equal 21.10

INITIAL GLOBAL BRINE CONCENTRATIONS (FRACTION)
....

All values for this array equal 0.0000E+00

This page is Blank.

```
*** STATE VARIABLE INITIALIZATION ***
-------------------------------------

        AMOUNT IN-PLACE
        ...............
      WATER  5.98172E+06 (KG)
     ENERGY  5.29130E+11 (J)
      BRINE  0.00000E+00 (KG)
```

```
*** RECURRENT DATA SPECIFICATION BEGINNING AT TIME =  0.0000E+00 (SECS) ***
---------------------------------------------------------------------------

                INPUT CONTROL OPTIONS
  ...................................................
  INDQ IWELL IMETH ITHRU IRSS IPROD IOPT INDT ICLL IRCH ICHCR
  ...................................................
   2   1   1   0   0   0   0   0   0   0   0

       WARNING - Large Peclet number (DELX/ALPHAL)
     For CIT, small dispersivity may cause oscillations

        Maximum Peclet number =  2.339E+03


        METHOD = 1       WT FACTOR =  0.5


         *** WELL SPECIFICATION ***
         -------------------------

        TOTAL NUMBER OF WELLS =   2

               WELL RATES
          ....................
           WELL       RATE
          NUMBER    (CU. M/SEC)
          ....................
     (POSITIVE-PRODUCTION-OUT  :  NEGATIVE-INJECTION-IN)

             1     -2.8900E-04
```

2 0.0000E+00

WELL DATA

WELL NO	I	J	PERFS K1	K2	SPEC OPTN	WI (SQ.M/SEC)	BHP (PA)	TINJ (DEG.C)	CINJ FRAC.
1	1	1	1	1	1	1.00	0.000E+00	21.1	1.000
2	51	1	1	1	1	1.00	0.000E+00	21.1	0.000

TIME STEPPING AND OUTPUT CONTROL OPTIONS

TCHG	DT	IO1	IO2	IO3	IO4	IO5	IO6	IO8	RSTWR	MAP	MDAT	IIPRT	IO5D	IO8D	IIPRTD
4.320E+05	4.320E+04	-1	-1	-1	-1	-1	-1	0	0	0	0	0	0	0	0

*** RECURRENT DATA SPECIFICATION BEGINNING AT TIME = 4.3200E+05 (SECS) ***

INPUT CONTROL OPTIONS

INDQ	IWELL	IMETH	ITHRU	IRSS	IPROD	IOPT	INDT	ICLL	IRCH	ICHCR
0	0	0	0	0	0	0	0	0	0	0

TIME STEPPING AND OUTPUT CONTROL OPTIONS

TCHG	DT	IO1	IO2	IO3	IO4	IO5	IO6	IO8	RSTWR	MAP	MDAT	IIPRT	IO5D	IO8D	IIPRTD
1.728E+06	4.320E+04	-1	-1	1	-1	-1	1	0	0	0	0	0	0	0	0

ELAPSED SIMULATION TIME 1.7280E+06 SECS (20.00 DAYS , 5.4795E-02 YEARS)
****

TIME STEP NUMBER 40 NUMBER OF OUTER ITERATIONS 1 CURRENT TIME STEP 4.3200E+04 SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

*** ONE-DIMENSIONAL GLOBAL SYSTEM ***

BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC	BLOCK NO.	PRESSURE (PA)	TEMP (DEG.C)	BRINE CONC FRAC
1	2.0987E+03	21.100	1.0000	2	2.0776E+03	21.100	1.0000	3	2.0565E+03	21.100	1.0000
4	2.0354E+03	21.100	1.0000	5	2.0143E+03	21.100	1.0000	6	1.9932E+03	21.100	1.0000
7	1.9721E+03	21.100	1.0000	8	1.9510E+03	21.100	1.0000	9	1.9299E+03	21.100	1.0000
10	1.9088E+03	21.100	1.0000	11	1.8878E+03	21.100	1.0000	12	1.8667E+03	21.100	1.0000
13	1.8456E+03	21.100	1.0000	14	1.8245E+03	21.100	1.0000	15	1.8034E+03	21.100	1.0000
16	1.7823E+03	21.100	1.0000	17	1.7612E+03	21.100	1.0000	18	1.7401E+03	21.100	1.0000
19	1.7190E+03	21.100	1.0000	20	1.6979E+03	21.100	1.0000	21	1.6768E+03	21.100	1.0000
22	1.6557E+03	21.100	1.0000	23	1.6346E+03	21.100	1.0000	24	1.6135E+03	21.100	1.0000
25	1.5924E+03	21.100	1.0000	26	1.5714E+03	21.100	1.0000	27	1.5503E+03	21.100	1.0000
28	1.5292E+03	21.100	1.0000	29	1.5081E+03	21.100	1.0000	30	1.4870E+03	21.100	1.0000
31	1.4659E+03	21.100	1.0000	32	1.4448E+03	21.100	1.0000	33	1.4237E+03	21.100	1.0000
34	1.4026E+03	21.100	1.0000	35	1.3815E+03	21.100	1.0000	36	1.3604E+03	21.100	1.0000
37	1.3393E+03	21.100	1.0000	38	1.3182E+03	21.100	1.0000	39	1.2971E+03	21.100	1.0000
40	1.2761E+03	21.100	1.0000	41	1.2550E+03	21.100	1.0000	42	1.2339E+03	21.100	1.0000
43	1.2128E+03	21.100	1.0000	44	1.1917E+03	21.100	1.0000	45	1.1706E+03	21.100	1.0000
46	1.1495E+03	21.100	1.0000	47	1.1284E+03	21.100	1.0000	48	1.1073E+03	21.100	1.0000
49	1.0862E+03	21.100	1.0000	50	1.0651E+03	21.100	1.0000	51	1.0440E+03	21.100	1.0000
52	1.0229E+03	21.100	1.0000	53	1.0018E+03	21.100	1.0000	54	9.8075E+02	21.100	1.0000
55	9.5966E+02	21.100	1.0000	56	9.3856E+02	21.100	1.0000	57	9.1747E+02	21.100	1.0000
58	8.9638E+02	21.100	0.9999	59	8.7528E+02	21.100	0.9999	60	8.5419E+02	21.100	0.9997
61	8.3310E+02	21.100	0.9994	62	8.1200E+02	21.100	0.9989	63	7.9091E+02	21.100	0.9979
64	7.6982E+02	21.100	0.9960	65	7.4872E+02	21.100	0.9923	66	7.2763E+02	21.100	0.9856
67	7.0654E+02	21.100	0.9737	68	6.8544E+02	21.100	0.9533	69	6.6435E+02	21.100	0.9202
70	6.4326E+02	21.100	0.8693	71	6.2217E+02	21.100	0.7963	72	6.0107E+02	21.100	0.6996
73	5.7998E+02	21.100	0.5822	74	5.5889E+02	21.100	0.4531	75	5.3779E+02	21.100	0.3258
76	5.1670E+02	21.100	0.2140	77	4.9561E+02	21.100	0.1270	78	4.7451E+02	21.100	0.0676
79	4.5342E+02	21.100	0.0320	80	4.3233E+02	21.100	0.0134	81	4.1123E+02	21.100	0.0050
82	3.9014E+02	21.100	0.0016	83	3.6905E+02	21.100	0.0005	84	3.4795E+02	21.100	0.0001
85	3.2686E+02	21.100	0.0000	86	3.0577E+02	21.100	0.0000	87	2.8468E+02	21.100	0.0000
88	2.6358E+02	21.100	0.0000	89	2.4249E+02	21.100	0.0000	90	2.2140E+02	21.100	0.0000
91	2.0030E+02	21.100	0.0000	92	1.7921E+02	21.100	0.0000	93	1.5812E+02	21.100	0.0000
94	1.3702E+02	21.100	0.0000	95	1.1593E+02	21.100	0.0000	96	9.4837E+01	21.100	0.0000
97	7.3744E+01	21.100	0.0000	98	5.2651E+01	21.100	0.0000	99	3.1557E+01	21.100	0.0000
100	1.0464E+01	21.100	0.0000								

```
AQUIFER INFLUX RATES  (POSITIVE-IN : NEGATIVE-OUT)
..................................................

INFLUENCE BLK NO      1
BLOCK (I,J,K)   (100,  1,  1)(
FLUID  (KG/SEC)   -2.889E-01
BRINE  (KG/SEC)   -2.188E-22

==========================================================================

NORMAL TERMINATION   (ITIME =   40 ; TIME = 1.7280E+06 )
      CPU elapsed time =  16.26     seconds
```

```
PROB. 5 (MR) ++ FLOW & Mass VERIFICATION - Metric System. - Cartesian COORDS
Transport of Continuous Point Source (Beljin, 1993), Transient Flow and Mass
 4  0  0  0  1  0  1  1  0  0000          M-2
 32  5  1  1  1  1  0  1  1  10  0 0  00    M-3-1
  0  0  0  0                             M-3-2
  1  1 0 1 1.e+20                           R0-1-1
  0. 0. 0.                               R0-2-1
  0. 0. 0.                               R0-2-2
1.00E-15 1.E-15   1.     1.     1.              R1-1
1.     1.     1.     0.   21.30    4.27   1.E-50   R1-2
1690.  0.0      21.1    1000.   1000.             R1-3
  0   0   0   2                          R1-6
21.1   .001    21.1    .001                    R1-7
0.     21.1                              R1-11
33.50     21.1                             R1-11
  0   0                                  R1-12
21.1   0.0      0.      0.                   R1-16
32*60.
5*60.
33.5
1.9e-6 1.9E-6 1.9E-6 .35 0. 0. 0.                R1-20
 000000                                  R1-26-BLNK
  4   0                                  R1-27
  1  1 1 5  1 1 0                           R1-28-1
  1. 1.883e7 21.1 0.0 21.1 0.                  R1-28-2
  32 32 1 5  1 1 0                          R1-28-1
  2. 0. 21.1 0. 21.1 0.                      R1-28-2
  000000 0
000000
  0   1   0                              I-1
  1.9e-6                                 I-3
0.                                       R1A-2
  0   0   1   0   1   0   0   0   0   00          R2-1
  1   0.5                                R2-2
1                                        R2-9
1 1 3 1                                  R2-10-1
0. 0  -2.730324e-4                          R2-10-2
0 000                                    R2-10-END
17.280e+6 8.640e+6  000000                  R2-12
 -1  -1  -1  -1 -1 0  000010 -1 0              R2-13
  0   0   0   0   0   0   0   0   0   0 0      R2-1
```

```
24.192e+7 8.64e+6  8.64e+6 0. 0.  0. 24.192e+7  17.28e+6          R2-12
 -1   -1  1  -1  1  -1  0 0 0 0 1  0 -1 0             R2-13
  0   0   0   1   0   0   0   0   0   0 0            R2-1-STOP
```

```
**************************************************
*                                    *
*    >>> S W I F T / 4 8 6 <<<       *
*                                    *
**************************************************
*                                    *
*          SANDIA Waste-Isolation          *
*          Flow and Transport in          *
*        Porous and/or Fractured Media        *
*                                    *
*        Quality Assurance Version 2.53        *
*                                    *
*          --- Transport Equations ---          *
* Fluid free-water surface (steady or transient) *
*        Energy-temperature (transient)        *
* Dominant specie-brine (steady or transient)  *
*   Trace species-radionuclides (transient)    *
*                                    *
*          --- Code evolution ---          *
*     Intera Technologies, Inc. 1975-1982     *
*          GeoTrans, Inc. 1982-1993          *
```

```
*                                  *
*    Copyright GeoTrans, Inc. 1993       *
*                                  *
**************************************************
```

```
*** TITLE CARDS ***
-------------------

**********************************************************************************
*                                                                                *
* PROB. 5.0 (MR) ++ FLOW & Mass VERIFICATION - Metric System. - Cartesian C      *
*                                                                                *
* Transport of Continuous Point Source (Beljin, 1993), Transient Flow and Mass   *
*                                                                                *
**********************************************************************************

*** INTEGER CONTROL SPECIFICATION ***
-------------------------------------

*** EXECUTION CONTROL OPTIONS ***
EQUATIONS SOLVING INDEX ............. NCALL.  4
RESTART RECORD NUMBER ............... RSTST..000E+00
WELLBORE DATA KEY ................... ISURF.  0
FREE WATER SURFACE OPTION ........... IFREE.  0
PLOTTING KEYS - PRESSURE ............ NPLP .  1
        - TEMPERATURE ......... NPLT .  0
        - CONCENTRATION ....... NPLC .  1
UNITS ARE IN (0=ENGLISH, 1=METRIC) .. IUNIT.  1
NUCLIDE MONITOR (UNIT9) OPTION ...... LBIO .  0
MAP[ij] {j: 0=NO,1=ASCII,2=BINARY) .. LMAPIT  0
     {i: 0=Datum, 1=Envr H, 2=Fresh Wat H}
MASS BALANCE AUXILIARY FILE (UNIT17). LMBAL   0
AQUIFER INFLUENCE FUNC FILE (UNIT18). LAIF .  0
PRINT REQUENCY FOR L2SOR ............ L2SORP  5

*** PROBLEM DIMENSIONS ***
NUMBER OF BLOCKS IN X-DIRECTION ..... NX ...  32
NUMBER OF BLOCKS IN Y-DIRECTION ..... NY ...  5
NUMBER OF BLOCKS IN Z-DIRECTION ..... NZ ...  1
```

```
INDEX OF RESERVOIR HETEROGENEITY .... HTG ..  1
NO OF RADIOACTIVE COMPONENTS ........ NCP ..  1
NUMBER OF ROCK TYPES ................ NRT ..  1
OUTPUT CONTROL INDEX ................ KOUT .  0
PRINT CONTROL KEY ................... PRT ..  1
MAX NO OF RADIOACTIVE SOURCE BLOCKS . NSMAX   1
MAX NO OF AQUIFER INFL FN BLOCKS .... NABLMX 10
MAX NO OF SURFACE RECHARGE BLOCKS ... NRCHMX  0
METHOD OF SOLUTION .................. METHOD  0


 *** WASTE INVENTORY TABLE ENTRIES ***
NUMBER OF INTERPOLATION TIMES ....... NTIME   0
REPOSITORY AREAL HEATING CONTROL .... KHEAT   0
NUMBER OF REPOSITORY BLOCKS ......... NREPB   0

 *** LOCAL (MATRIX) SUBSYSTEM CONTROL ***
SOLUTION CONTROL .................... KSLVD   0
NUMBER OF LOCAL ROCK TYPES .......... NRTD .  0
OUTPUT CONTROL KEY .................. KOUTD   0
```

```
*** RADIONUCLIDE DECAY CHAIN DATA ***
-------------------------------------

.......................................................................................
NO MASS COMPONENT  PARENT COMP      DECAY    ADJUST   FREUNDLICH COEFFS. KAPPA (CU.M/KG)  **ETA  AND ETA
       NO    FRACTION   H LIFE (YRS)  LAMDA      ROCK TYPES
                                  1
.......................................................................................

1   1           1.0000E+20  1      0.000E+00   1.000E+00


*** UTILIZATION OF COMMON ARRAY STORAGE ***
-------------------------------------------

............................................................
.  BLANK COMMON  .          LABELLED COMMON         .     .
.-------------------.---------------------------------------.   .
.  REAL  INTEGER  .            REAL          INTEGER  .     .
. ------- -------  .  ---------------------------- ---------.   .
.                .    G      G2      G3      IG   .  TOTAL .
.                .  -------  -------  -------  ------- . ------- .

CODE DIMENSIONS : .  16403   4469  .  650000  450000  700000   140000  . 1940000 .

DATA REQUIREMENTS: .  16403   4469  .   8812    3846    4961     1677  .  19296 .
.                .                                  .     .
............................................................
```

```
*** GLOBAL (FRACTURE) AND FLUID DATA ***
WATER COMPRESSIBILITY .............. CW .... 1.00000E-15  (1/PA)
ROCK COMPRESSIBILITY ............... CR .... 1.00000E-15  (1/PA)
WATER THERMAL EXPANSION FACTOR ..... CTW ... 1.00000E+00  (1/DEG.C)
WATER HEAT CAPACITY ................ CPW ... 1.00000E+00  (J/KG-DEG.C)
ROCK HEAT CAPACITY ................. CPR ... 1.00000E+00  (J/CU.M-DEG.C)
MEDIUM THERMAL COND. IN X-DIR ...... UKTX .. 1.00000E+00  (J/M-SEC-DEG.C)
MEDIUM THERMAL COND. IN Y-DIR ...... UKTY .. 1.00000E+00  (J/M-SEC-DEG.C)
MEDIUM THERMAL COND. IN Z-DIR ...... UKTZ .. 1.00000E+00  (J/M-SEC-DEG.C)
LONGITUDINAL DISPERSIVITY FACTOR ... ALPHL.. 2.13000E+01  (M)
TRANSVERSE DISPERSIVITY FACTOR ..... ALPHT.. 4.27000E+00  (M)
EFFECTIVE MOLECULAR DIFFUSION ...... DMEFF.. 1.00000E-50  (SQ.M/SEC)
ROCK DENSITY (SOLID PARTICLE) ...... BROCK.. 1.69000E+03  (KG/CU.M)
REF. PRESSURE FOR FLUID DENSITIES .. PBWR .. 0.00000E+00  (PA)
REF. TEMP. FOR FLUID DENSITIES ..... TBWR .. 2.11000E+01  (DEG.C)
FLUID DENSITY (AT C=0.0) ........... BWRN .. 1.00000E+03  (KG/CU.M)
BRINE FLUID DENSITY (AT C=1.0) ..... BWRI .. 1.00000E+03  (KG/CU.M)
```

TEMPERATURE-VISCOSITY TABLE

TEMPERATURE (DEG.C)	VISCOSITY (PA-SEC)
AQUIFER FLUID (AT C=0.0)	
2.11000E+01	1.00000E-03
SATURATED BRINE (AT C=1.0)	
2.11000E+01	1.00000E-03

DEPTH-TEMPERATURE INITIALIZATION

DEPTH (M)	TEMPERATURE (DEG.C)
0.0000E+00	21.10
33.50	21.10

```
 *** REFERENCE CONDITIONS FOR FLUID AND GLOBAL SYSTEM ***
REFERENCE FLUID TEMPERATURE ........ TO .... 2.11000E+01 (DEG.C)
INITIAL AND REFERENCE PRESSURE ..... PINIT   0.00000E+00 (PA)
REFERENCE DEPTH OF INITIAL P & T ... HINIT . 0.00000E+00 (M)
DEPTH FROM REF. PLANE TO DATUM ..... HDATUM  0.00000E+00 (M)
REFERENCE WATER DENSITY (AT C=0.0) . BW0 ... 1.00000E+03 (KG/CU.M)
REFERENCE WATER INTERNAL ENERGY .... UW0 ... 8.84578E+04 (J/KG)
REFERENCE WATER ENTHALPY ........... ETH ... 8.84578E+04 (J/KG)
```

*** GLOBAL SYSTEM GRIDDING ***

X-DIRECTION GRID BLOCK DIMENSIONS (M)

	1	2	3	4	5	6	7	8	9	10
1- 10	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
11- 20	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
21- 30	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
31- 32	60.00	60.00								

Y-DIRECTION GRID BLOCK DIMENSIONS (M)

	1	2	3	4	5
1- 5	60.00	60.00	60.00	60.00	60.00

Z-DIRECTION GRID BLOCK DIMENSIONS (M)

	1
1- 1	33.50

X-DIRECTION DISTANCE TO GRID BLOCK CENTER (M)

	1	2	3	4	5	6	7	8	9	10
1- 10	30.00	90.00	150.0	210.0	270.0	330.0	390.0	450.0	510.0	570.0
11- 20	630.0	690.0	750.0	810.0	870.0	930.0	990.0	1050.	1110.	1170.
21- 30	1230.	1290.	1350.	1410.	1470.	1530.	1590.	1650.	1710.	1770.
31- 32	1830.	1890.								

Y-DIRECTION DISTANCE TO GRID BLOCK CENTER (M)

	1	2	3	4	5
1- 5	30.00	90.00	150.0	210.0	270.0

X-DIRECTION DISTANCE TO LEADING BLOCK EDGE (M)

	1	2	3	4	5	6	7	8	9	10
1- 10	0.0000E+00	60.00	120.0	180.0	240.0	300.0	360.0	420.0	480.0	540.0
11- 20	600.0	660.0	720.0	780.0	840.0	900.0	960.0	1020.	1080.	1140.
21- 30	1200.	1260.	1320.	1380.	1440.	1500.	1560.	1620.	1680.	1740.

31- 33	1800.	1860.	1920.			

Y-DIRECTION DISTANCE TO LEADING BLOCK EDGE (M)

	1	2	3	4	5	6
1- 6	0.0000E+00	60.00	120.0	180.0	240.0	300.0

```
*** SPECIFICATION OF HOMOGENEOUS GLOBAL SYSTEM ***
--------------------------------------------------

HYDRAULIC CONDUCTIVITY IN X-DIR .... KX ....  1.90000E-06  (M/SEC)
HYDRAULIC CONDUCTIVITY IN Y-DIR .... KY ....  1.90000E-06  (M/SEC)
HYDRAULIC CONDUCTIVITY IN Z-DIR .... KZ ....  1.90000E-06  (M/SEC)
POROSITY ........................... PHI ...  0.35000      (FRACTION)
RESERVOIR DIP IN X-DIRECTION ....... SINX ..  0.00000E+00  (SIN OF ANGLE)
RESERVOIR DIP IN Y-DIRECTION ....... SINY ..  0.00000E+00  (SIN OF ANGLE)
DEPTH TO CENTER GRID BLOCK (1,1,1) . DEPTH .  0.00000E+00  (M)
```

DEPTH OF BLOCK CENTERS BELOW REFERENCE PLANE (M)
(Measured positive downwards)
....

All values for this array equal 0.0000E+00

NATURAL WATER FLOW VELOCITY IN THE X-DIRECTION = 1.90000E-06 (M/SEC)

GLOBAL BOUNDARY PRESSURES (PA)
....

All values for this array equal 0.0000E+00

GLOBAL BOUNDARY TEMPERATURES (DEG.C)
....

	1	2	3	4	5	6	7	8	9	10
1	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

11	12	13	14	15	16	17	18	19	20

1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	21	22	23	24	25	26	27	28	29	30
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	31	32
1	0.0000	21.1000
2	0.0000	21.1000
3	0.0000	21.1000
4	0.0000	21.1000
5	0.0000	21.1000

GLOBAL BOUNDARY CONCENTRATIONS (FRACTION)

....

All values for this array equal 0.0000E+00

*** SALT DISSOLUTION ***

(PRODUCT OF DISSOLUTION RATE AND SOLUBLE FRACTION)

ROCK TYPE	PRODUCT (1/SEC)
1	0.0000E+00

GLOBAL PORE VOLUME (M**3)
....

All values for this array equal 4.2210E+04

GLOBAL ROCK TYPES
....

All values for this array equal 1

X-DIRECTION PECLET NO (DELX/ALPHAL)
....

All values for this array equal 2.817

Y-DIRECTION PECLET NO (DELY/ALPHAL)
....

All values for this array equal 2.817

GLOBAL X-DIRECTION TRANSMISSIVITY (SQ.M/SEC)

....

All values for this array equal 6.3650E-05

GLOBAL Y-DIRECTION TRANSMISSIVITY (SQ.M/SEC)
....

All values for this array equal 6.3650E-05

GRID BLOCK CENTER ELEVATION ABOVE DATUM PLANE (M)
(Measured positive upwards)
....

All values for this array equal 0.0000E+00

GRID BLOCK THICKNESS (M)
....

All values for this array equal 33.50

INITIAL GLOBAL PRESSURE AT ELEVATION H (PA)
....

1 2 3 4 5 6 7 8 9 10

```
 1  0.00000E+00-5.88420E+05-1.17684E+06-1.76526E+06-2.35368E+06-2.94210E+06-3.53052E+06-4.11894E+06-4.70736E+06-5.29578E+06
 2  0.00000E+00-5.88420E+05-1.17684E+06-1.76526E+06-2.35368E+06-2.94210E+06-3.53052E+06-4.11894E+06-4.70736E+06-5.29578E+06
 3  0.00000E+00-5.88420E+05-1.17684E+06-1.76526E+06-2.35368E+06-2.94210E+06-3.53052E+06-4.11894E+06-4.70736E+06-5.29578E+06
 4  0.00000E+00-5.88420E+05-1.17684E+06-1.76526E+06-2.35368E+06-2.94210E+06-3.53052E+06-4.11894E+06-4.70736E+06-5.29578E+06
 5  0.00000E+00-5.88420E+05-1.17684E+06-1.76526E+06-2.35368E+06-2.94210E+06-3.53052E+06-4.11894E+06-4.70736E+06-5.29578E+06

        11         12         13         14         15         16         17         18         19         20

 1 -5.88420E+06-6.47262E+06-7.06104E+06-7.64946E+06-8.23788E+06-8.82630E+06-9.41472E+06-1.00031E+07-1.05916E+07-1.11800E+07
 2 -5.88420E+06-6.47262E+06-7.06104E+06-7.64946E+06-8.23788E+06-8.82630E+06-9.41472E+06-1.00031E+07-1.05916E+07-1.11800E+07
 3 -5.88420E+06-6.47262E+06-7.06104E+06-7.64946E+06-8.23788E+06-8.82630E+06-9.41472E+06-1.00031E+07-1.05916E+07-1.11800E+07
 4 -5.88420E+06-6.47262E+06-7.06104E+06-7.64946E+06-8.23788E+06-8.82630E+06-9.41472E+06-1.00031E+07-1.05916E+07-1.11800E+07
 5 -5.88420E+06-6.47262E+06-7.06104E+06-7.64946E+06-8.23788E+06-8.82630E+06-9.41472E+06-1.00031E+07-1.05916E+07-1.11800E+07

        21         22         23         24         25         26         27         28         29         30

 1 -1.17684E+07-1.23568E+07-1.29452E+07-1.35337E+07-1.41221E+07-1.47105E+07-1.52989E+07-1.58873E+07-1.64758E+07-1.70642E+07
 2 -1.17684E+07-1.23568E+07-1.29452E+07-1.35337E+07-1.41221E+07-1.47105E+07-1.52989E+07-1.58873E+07-1.64758E+07-1.70642E+07
 3 -1.17684E+07-1.23568E+07-1.29452E+07-1.35337E+07-1.41221E+07-1.47105E+07-1.52989E+07-1.58873E+07-1.64758E+07-1.70642E+07
 4 -1.17684E+07-1.23568E+07-1.29452E+07-1.35337E+07-1.41221E+07-1.47105E+07-1.52989E+07-1.58873E+07-1.64758E+07-1.70642E+07
 5 -1.17684E+07-1.23568E+07-1.29452E+07-1.35337E+07-1.41221E+07-1.47105E+07-1.52989E+07-1.58873E+07-1.64758E+07-1.70642E+07

        31         32

 1 -1.76526E+07-1.82410E+07
 2 -1.76526E+07-1.82410E+07
 3 -1.76526E+07-1.82410E+07
 4 -1.76526E+07-1.82410E+07
 5 -1.76526E+07-1.82410E+07
```

```
INITIAL GLOBAL PRESSURE AT DATUM ELEVATION (PA)
.............................................

      1      2      3      4      5      6      7      8      9     10

 1  0.00000E+00-5.88420E+05-1.17684E+06-1.76526E+06-2.35368E+06-2.94210E+06-3.53052E+06-4.11894E+06-4.70736E+06-5.29578E+06
 2  0.00000E+00-5.88420E+05-1.17684E+06-1.76526E+06-2.35368E+06-2.94210E+06-3.53052E+06-4.11894E+06-4.70736E+06-5.29578E+06
 3  0.00000E+00-5.88420E+05-1.17684E+06-1.76526E+06-2.35368E+06-2.94210E+06-3.53052E+06-4.11894E+06-4.70736E+06-5.29578E+06
 4  0.00000E+00-5.88420E+05-1.17684E+06-1.76526E+06-2.35368E+06-2.94210E+06-3.53052E+06-4.11894E+06-4.70736E+06-5.29578E+06
 5  0.00000E+00-5.88420E+05-1.17684E+06-1.76526E+06-2.35368E+06-2.94210E+06-3.53052E+06-4.11894E+06-4.70736E+06-5.29578E+06

     11     12     13     14     15     16     17     18     19     20

 1 -5.88420E+06-6.47262E+06-7.06104E+06-7.64946E+06-8.23788E+06-8.82630E+06-9.41472E+06-1.00031E+07-1.05916E+07-1.11800E+07
 2 -5.88420E+06-6.47262E+06-7.06104E+06-7.64946E+06-8.23788E+06-8.82630E+06-9.41472E+06-1.00031E+07-1.05916E+07-1.11800E+07
 3 -5.88420E+06-6.47262E+06-7.06104E+06-7.64946E+06-8.23788E+06-8.82630E+06-9.41472E+06-1.00031E+07-1.05916E+07-1.11800E+07
 4 -5.88420E+06-6.47262E+06-7.06104E+06-7.64946E+06-8.23788E+06-8.82630E+06-9.41472E+06-1.00031E+07-1.05916E+07-1.11800E+07
 5 -5.88420E+06-6.47262E+06-7.06104E+06-7.64946E+06-8.23788E+06-8.82630E+06-9.41472E+06-1.00031E+07-1.05916E+07-1.11800E+07

     21     22     23     24     25     26     27     28     29     30

 1 -1.17684E+07-1.23568E+07-1.29452E+07-1.35337E+07-1.41221E+07-1.47105E+07-1.52989E+07-1.58873E+07-1.64758E+07-1.70642E+07
 2 -1.17684E+07-1.23568E+07-1.29452E+07-1.35337E+07-1.41221E+07-1.47105E+07-1.52989E+07-1.58873E+07-1.64758E+07-1.70642E+07
 3 -1.17684E+07-1.23568E+07-1.29452E+07-1.35337E+07-1.41221E+07-1.47105E+07-1.52989E+07-1.58873E+07-1.64758E+07-1.70642E+07
 4 -1.17684E+07-1.23568E+07-1.29452E+07-1.35337E+07-1.41221E+07-1.47105E+07-1.52989E+07-1.58873E+07-1.64758E+07-1.70642E+07
 5 -1.17684E+07-1.23568E+07-1.29452E+07-1.35337E+07-1.41221E+07-1.47105E+07-1.52989E+07-1.58873E+07-1.64758E+07-1.70642E+07

     31     32

 1 -1.76526E+07-1.82410E+07
 2 -1.76526E+07-1.82410E+07
 3 -1.76526E+07-1.82410E+07
 4 -1.76526E+07-1.82410E+07
```

```
5 -1.76526E+07-1.82410E+07


        INITIAL GLOBAL TEMPERATURES (DEG.C)
        ..................................

      All values for this array equal   21.10


      INITIAL GLOBAL BRINE CONCENTRATIONS (FRACTION)
      ..............................................

      All values for this array equal  0.0000E+00


      COMP- 1  INITIAL GLOBAL CONCENTRATIONS (FRACTION)
      ..............................................

      All values for this array equal  0.0000E+00
```

```
*** STATE VARIABLE INITIALIZATION ***
-------------------------------------



        AMOUNT IN-PLACE
        ...............
      WATER  6.75360E+09 (KG)
     ENERGY  5.97409E+14 (J)
      BRINE  0.00000E+00 (KG)
COMPONENT NO 1  0.00000E+00 (KG)
```

```
*** RECURRENT DATA SPECIFICATION BEGINNING AT TIME =  0.0000E+00 (SECS) ***
----------------------------------------------------------------------------

                 INPUT CONTROL OPTIONS
   ..............................................................
   INDQ IWELL IMETH ITHRU IRSS IPROD IOPT INDT ICLL IRCH ICHCR
   ..............................................................
    0    0    1    0    1    0    0    0    0    0    0


                METHOD = 1       WT FACTOR =  0.5

  NOTE: FOR DIRECT D4 SOLUTION, THE A-ARRAY (G3)IN LABELLED COMMON GAMMA
      IS DIMENSIONED AT  700000 WORDS  BUT REQUIRES ONLY    4961 WORDS



                *** RADIOACTIVE SOURCE DATA ***
                -------------------------------

               NUMBER OF RADIOACTIVE SOURCES   1

.....................................................................................
SOURCE   LOCATION  BLOCK   FLUID       HEAT      COMPONENT
 NO    I  J  K  NO  (KG/SEC)   (J/SEC)     (KG/SEC)
.....................................................................................
 1    1  3  1  65  0.0000E+00  0.0000E+00  -2.7303E-04


              TIME STEPPING AND OUTPUT CONTROL OPTIONS
        ..........................................................................
          TCHG      DT  IO1  IO2  IO3  IO4  IO5  IO6  IO8  RSTWR  MAP  MDAT  IIPRT  IO5D  IO8D  IIPRTD
        ..........................................................................
```

```
1.728E+07 8.640E+06  -1  -1  -1  -1  -1   0   0   0   0   0   1   0  -1   0

     RADIONUCLIDE TIME STEP CONTROL - MAX CONC. CHANGE PER TIME STEP =  0.950
 PRESSURE EQUATION AFTER OUTER ITERATION NO.    1         RELATIVE CHANGE IS  63.00
```

ELAPSED SIMULATION TIME 8.6400E+06 (SECS)
****

GLOBAL X-DIR - DARCY VELOCITY (M/SEC)
....

All values for this array equal 1.9001E-06

GLOBAL Y-DIR - DARCY VELOCITY (M/SEC)
....

	1	2	3	4	5	6	7	8	9	10
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	0.00000E+00	1.20289E-20	1.20289E-20	6.01446E-21	1.20289E-20	1.20289E-20	6.01446E-21	6.01446E-21	0.00000E+00	-6.01446E-21
3	-1.20289E-20	-1.20289E-20	-1.20289E-20	6.01446E-21	6.01446E-21	0.00000E+00	-6.01446E-21	0.00000E+00	-6.01446E-21	0.00000E+00
4	0.00000E+00	1.20289E-20	0.00000E+00	-6.01446E-21	-1.20289E-20	0.00000E+00	1.20289E-20	6.01446E-21	6.01446E-21	6.01446E-21
5	1.20289E-20	-1.20289E-20	0.00000E+00	0.00000E+00	0.00000E+00	6.01446E-21	-6.01446E-21	0.00000E+00	6.01446E-21	6.01446E-21

	11	12	13	14	15	16	17	18	19	20
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	6.01446E-21	6.01446E-21	0.00000E+00	0.00000E+00	0.00000E+00	6.01446E-21	6.01446E-21	6.01446E-21	0.00000E+00	0.00000E+00
3	-6.01446E-21	-1.80434E-20	-6.01446E-21	-1.20289E-20	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	-3.00723E-21	0.00000E+00
4	0.00000E+00	6.01446E-21	6.01446E-21	1.20289E-20	6.01446E-21	1.20289E-20	1.20289E-20	6.01446E-21	3.00723E-21	0.00000E+00
5	-6.01446E-21	-6.01446E-21	-6.01446E-21	-1.20289E-20	-6.01446E-21	-6.01446E-21	-6.01446E-21	0.00000E+00	3.00723E-21	3.00723E-21

21 22 23 24 25 26 27 28 29 30

```
1  0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00
2  0.00000E+00-3.00723E-21-6.01446E-21-6.01446E-21-6.01446E-21-3.00723E-21-3.00723E-21-3.00723E-21-1.50361E-21 0.00000E+00
3  0.00000E+00-6.01446E-21 3.00723E-21 6.01446E-21 3.00723E-21 3.00723E-21 1.50361E-21 0.00000E+00 7.51807E-22 7.51807E-22
4  0.00000E+00 6.01446E-21 0.00000E+00 0.00000E+00 3.00723E-21 0.00000E+00-3.00723E-21-1.50361E-21-1.50361E-21-7.51807E-22
5  3.00723E-21 6.01446E-21 6.01446E-21 6.01446E-21 3.00723E-21 0.00000E+00 4.51084E-21 3.00723E-21 1.50361E-21 7.51807E-22


      31          32

1  0.00000E+00 0.00000E+00
2 -7.51807E-22-1.87952E-22
3  7.51807E-22 1.87952E-22
4  0.00000E+00 0.00000E+00
5  3.75903E-22 0.00000E+00

------------------------------------------------------------------------------------------------------------------------

        ELAPSED SIMULATION TIME  8.6400E+06 SECS (  100.0    DAYS   , 0.2740    YEARS )
       ******************************************************************************

      TIME STEP NUMBER    1    NUMBER OF OUTER ITERATIONS   1    CURRENT TIME STEP  1.000    SECS


                     AQUIFER INFLUX RATES  (POSITIVE-IN : NEGATIVE-OUT)
                     ..............................................

INFLUENCE BLK NO      1          2          3          4          5          6          7          8          9
BLOCK (I,J,K)   ( 1,  1,  1)( 1,  2,  1)( 1,  3,  1)( 1,  4,  1)( 1,  5,  1)( 32,  1,  1)( 32,  2,  1)( 32,  3,  1)( 32,  4,  1)
FLUID  (KG/SEC)   3.819E+00   3.819E+00   3.819E+00   3.819E+00   3.819E+00  -3.819E+00  -3.819E+00  -3.819E+00  -3.819E+00
NUCL  1(KG/SEC)   0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00   0.000E+00
```

```
INFLUENCE BLK NO      10
BLOCK (I,J,K)   ( 32,  5,  1)(
FLUID  (KG/SEC)  -3.819E+00
NUCL  1(KG/SEC)   0.000E+00
```

```
        ELAPSED SIMULATION TIME  1.7280E+07 SECS  (  200.0    DAYS   , 0.5479    YEARS )
        ******************************************************************************

      TIME STEP NUMBER     2   NUMBER OF OUTER ITERATIONS    0    CURRENT TIME STEP  8.6400E+06 SECS


                   AQUIFER INFLUX RATES  (POSITIVE-IN : NEGATIVE-OUT)
                   ..................................

INFLUENCE BLK NO      1          2          3          4          5          6          7          8          9
BLOCK (I,J,K)   ( 1,  1,  1)( 1,  2,  1)( 1,  3,  1)( 1,  4,  1)( 1,  5,  1)( 32,  1,  1)( 32,  2,  1)( 32,  3,  1)( 32,  4,  1)
FLUID  (KG/SEC)   3.819E+00   3.819E+00   3.819E+00   3.819E+00   3.819E+00  -3.819E+00  -3.819E+00  -3.819E+00  -3.819E+00
NUCL  1(KG/SEC)   1.038E-07   3.488E-06   1.172E-04   3.488E-06   1.038E-07  -2.585E-17  -4.469E-17  -6.141E-17  -4.469E-17

INFLUENCE BLK NO      10
BLOCK (I,J,K)   ( 32,  5,  1)(
FLUID  (KG/SEC)  -3.819E+00
NUCL  1(KG/SEC)  -2.585E-17
```

```
*** RECURRENT DATA SPECIFICATION BEGINNING AT TIME =  1.7280E+07 (SECS)  ***
---------------------------------------------------------------------------

              INPUT CONTROL OPTIONS
   ..................................................................
   INDQ  IWELL  IMETH  ITHRU  IRSS IPROD  IOPT  INDT  ICLL  IRCH  ICHCR
   ..................................................................
    0    0    0    0    0    0    0    0    0    0    0


             TIME STEPPING AND OUTPUT CONTROL OPTIONS
 ...............................................................................
   TCHG      DT   IO1  IO2  IO3  IO4  IO5  IO6  IO8  RSTWR  MAP  MDAT  IIPRT  IO5D  IO8D  IIPRTD
 ...............................................................................

 2.419E+08 8.640E+06  -1  -1   1  -1   1  -1   0   0   0   0   1   0  -1   0

       RADIONUCLIDE TIME STEP CONTROL - MAX CONC. CHANGE PER TIME STEP =  8.640E+06


------------------------------------------------------------------------------------------------------


  ELAPSED SIMULATION TIME  2.4192E+08 SECS  (  2800.    DAYS  ,  7.671    YEARS )
 ************************************************************************************

TIME STEP NUMBER    28    NUMBER OF OUTER ITERATIONS    0    CURRENT TIME STEP  8.6400E+06 SECS



            *** GLOBAL (FRACTURE) DEPENDENT VALUES ***
            -----------------------------------------
```

GLOBAL PRESSURE AT ELEVATION (PA)

	1	2	3	4	5	6	7	8	9	10
1	1.85358E+07	1.79473E+07	1.73589E+07	1.67705E+07	1.61820E+07	1.55936E+07	1.50052E+07	1.44167E+07	1.38283E+07	1.32398E+07
2	1.85358E+07	1.79473E+07	1.73589E+07	1.67705E+07	1.61820E+07	1.55936E+07	1.50052E+07	1.44167E+07	1.38283E+07	1.32398E+07
3	1.85358E+07	1.79473E+07	1.73589E+07	1.67705E+07	1.61820E+07	1.55936E+07	1.50052E+07	1.44167E+07	1.38283E+07	1.32398E+07
4	1.85358E+07	1.79473E+07	1.73589E+07	1.67705E+07	1.61820E+07	1.55936E+07	1.50052E+07	1.44167E+07	1.38283E+07	1.32398E+07
5	1.85358E+07	1.79473E+07	1.73589E+07	1.67705E+07	1.61820E+07	1.55936E+07	1.50052E+07	1.44167E+07	1.38283E+07	1.32398E+07

	11	12	13	14	15	16	17	18	19	20
1	1.26514E+07	1.20630E+07	1.14745E+07	1.08861E+07	1.02977E+07	9.70922E+06	9.12078E+06	8.53234E+06	7.94391E+06	7.35547E+06
2	1.26514E+07	1.20630E+07	1.14745E+07	1.08861E+07	1.02977E+07	9.70922E+06	9.12078E+06	8.53234E+06	7.94391E+06	7.35547E+06
3	1.26514E+07	1.20630E+07	1.14745E+07	1.08861E+07	1.02977E+07	9.70922E+06	9.12078E+06	8.53234E+06	7.94391E+06	7.35547E+06
4	1.26514E+07	1.20630E+07	1.14745E+07	1.08861E+07	1.02977E+07	9.70922E+06	9.12078E+06	8.53234E+06	7.94391E+06	7.35547E+06
5	1.26514E+07	1.20630E+07	1.14745E+07	1.08861E+07	1.02977E+07	9.70922E+06	9.12078E+06	8.53234E+06	7.94391E+06	7.35547E+06

	21	22	23	24	25	26	27	28	29	30
1	6.76703E+06	6.17859E+06	5.59016E+06	5.00172E+06	4.41328E+06	3.82484E+06	3.23641E+06	2.64797E+06	2.05953E+06	1.47109E+06
2	6.76703E+06	6.17859E+06	5.59016E+06	5.00172E+06	4.41328E+06	3.82484E+06	3.23641E+06	2.64797E+06	2.05953E+06	1.47109E+06
3	6.76703E+06	6.17859E+06	5.59016E+06	5.00172E+06	4.41328E+06	3.82484E+06	3.23641E+06	2.64797E+06	2.05953E+06	1.47109E+06
4	6.76703E+06	6.17859E+06	5.59016E+06	5.00172E+06	4.41328E+06	3.82484E+06	3.23641E+06	2.64797E+06	2.05953E+06	1.47109E+06
5	6.76703E+06	6.17859E+06	5.59016E+06	5.00172E+06	4.41328E+06	3.82484E+06	3.23641E+06	2.64797E+06	2.05953E+06	1.47109E+06

	31	32
1	8.82656E+05	2.94219E+05

2	8.82656E+05	2.94219E+05
3	8.82656E+05	2.94219E+05
4	8.82656E+05	2.94219E+05
5	8.82656E+05	2.94219E+05

GLOBAL PRESSURE AT DATUM (PA)
....

	1	2	3	4	5	6	7	8	9	10
1	1.85358E+07	1.79473E+07	1.73589E+07	1.67705E+07	1.61820E+07	1.55936E+07	1.50052E+07	1.44167E+07	1.38283E+07	1.32398E+07
2	1.85358E+07	1.79473E+07	1.73589E+07	1.67705E+07	1.61820E+07	1.55936E+07	1.50052E+07	1.44167E+07	1.38283E+07	1.32398E+07
3	1.85358E+07	1.79473E+07	1.73589E+07	1.67705E+07	1.61820E+07	1.55936E+07	1.50052E+07	1.44167E+07	1.38283E+07	1.32398E+07
4	1.85358E+07	1.79473E+07	1.73589E+07	1.67705E+07	1.61820E+07	1.55936E+07	1.50052E+07	1.44167E+07	1.38283E+07	1.32398E+07
5	1.85358E+07	1.79473E+07	1.73589E+07	1.67705E+07	1.61820E+07	1.55936E+07	1.50052E+07	1.44167E+07	1.38283E+07	1.32398E+07

	11	12	13	14	15	16	17	18	19	20
1	1.26514E+07	1.20630E+07	1.14745E+07	1.08861E+07	1.02977E+07	9.70922E+06	9.12078E+06	8.53234E+06	7.94391E+06	7.35547E+06
2	1.26514E+07	1.20630E+07	1.14745E+07	1.08861E+07	1.02977E+07	9.70922E+06	9.12078E+06	8.53234E+06	7.94391E+06	7.35547E+06
3	1.26514E+07	1.20630E+07	1.14745E+07	1.08861E+07	1.02977E+07	9.70922E+06	9.12078E+06	8.53234E+06	7.94391E+06	7.35547E+06
4	1.26514E+07	1.20630E+07	1.14745E+07	1.08861E+07	1.02977E+07	9.70922E+06	9.12078E+06	8.53234E+06	7.94391E+06	7.35547E+06
5	1.26514E+07	1.20630E+07	1.14745E+07	1.08861E+07	1.02977E+07	9.70922E+06	9.12078E+06	8.53234E+06	7.94391E+06	7.35547E+06

	21	22	23	24	25	26	27	28	29	30
1	6.76703E+06	6.17859E+06	5.59016E+06	5.00172E+06	4.41328E+06	3.82484E+06	3.23641E+06	2.64797E+06	2.05953E+06	1.47109E+06
2	6.76703E+06	6.17859E+06	5.59016E+06	5.00172E+06	4.41328E+06	3.82484E+06	3.23641E+06	2.64797E+06	2.05953E+06	1.47109E+06
3	6.76703E+06	6.17859E+06	5.59016E+06	5.00172E+06	4.41328E+06	3.82484E+06	3.23641E+06	2.64797E+06	2.05953E+06	1.47109E+06
4	6.76703E+06	6.17859E+06	5.59016E+06	5.00172E+06	4.41328E+06	3.82484E+06	3.23641E+06	2.64797E+06	2.05953E+06	1.47109E+06
5	6.76703E+06	6.17859E+06	5.59016E+06	5.00172E+06	4.41328E+06	3.82484E+06	3.23641E+06	2.64797E+06	2.05953E+06	1.47109E+06

	31	32
1	8.82656E+05	2.94219E+05
2	8.82656E+05	2.94219E+05
3	8.82656E+05	2.94219E+05
4	8.82656E+05	2.94219E+05
5	8.82656E+05	2.94219E+05

GLOBAL TEMPERATURE (DEG.C)
....

All values for this array equal 21.10

GLOBAL BRINE CONCENTRATION (FRACTION)
....

All values for this array equal 0.0000E+00

COMP- 1 GLOBAL RADIONUCLIDE CONCENTRATION (FRACTION)
....

1 2 3 4 5 6 7 8 9 10

1	1.81349E-07	6.02217E-07	1.16509E-06	1.81933E-06	2.52682E-06	3.25892E-06	3.99362E-06	4.71274E-06	5.39931E-06	6.03546E-06
2	3.58709E-06	6.80541E-06	9.26044E-06	1.11204E-05	1.25173E-05	1.35546E-05	1.43113E-05	1.48459E-05	1.51981E-05	1.53908E-05
3	6.39542E-05	5.66758E-05	5.06400E-05	4.56119E-05	4.14036E-05	3.78634E-05	3.48673E-05	3.23107E-05	3.01017E-05	2.81569E-05
4	3.58709E-06	6.80541E-06	9.26044E-06	1.11204E-05	1.25173E-05	1.35546E-05	1.43113E-05	1.48459E-05	1.51981E-05	1.53908E-05
5	1.81349E-07	6.02217E-07	1.16509E-06	1.81933E-06	2.52682E-06	3.25892E-06	3.99362E-06	4.71274E-06	5.39931E-06	6.03546E-06

	11	12	13	14	15	16	17	18	19	20
1	6.60125E-06	7.07499E-06	7.43482E-06	7.66139E-06	7.74073E-06	7.66689E-06	7.44334E-06	7.08312E-06	6.60756E-06	6.04398E-06
2	1.54330E-05	1.53233E-05	1.50550E-05	1.46217E-05	1.40217E-05	1.32620E-05	1.23597E-05	1.13416E-05	1.02417E-05	9.09860E-06
3	2.63988E-05	2.47569E-05	2.31696E-05	2.15880E-05	1.99792E-05	1.83275E-05	1.66345E-05	1.49166E-05	1.32007E-05	1.15201E-05
4	1.54330E-05	1.53233E-05	1.50550E-05	1.46217E-05	1.40217E-05	1.32620E-05	1.23597E-05	1.13416E-05	1.02417E-05	9.09860E-06
5	6.60125E-06	7.07499E-06	7.43482E-06	7.66139E-06	7.74073E-06	7.66689E-06	7.44334E-06	7.08312E-06	6.60756E-06	6.04398E-06

	21	22	23	24	25	26	27	28	29	30
1	5.42279E-06	4.77451E-06	4.12722E-06	3.50468E-06	2.92515E-06	2.40113E-06	1.93958E-06	1.54269E-06	1.20892E-06	9.33579E-07
2	7.95109E-06	6.83514E-06	5.78112E-06	4.81213E-06	3.94342E-06	3.18267E-06	2.53094E-06	1.98399E-06	1.53383E-06	1.16963E-06
3	9.90886E-06	8.39811E-06	7.01281E-06	5.77008E-06	4.67872E-06	3.73972E-06	2.94752E-06	2.29158E-06	1.75814E-06	1.33118E-06
4	7.95109E-06	6.83514E-06	5.78112E-06	4.81213E-06	3.94342E-06	3.18267E-06	2.53094E-06	1.98399E-06	1.53383E-06	1.16963E-06
5	5.42279E-06	4.77451E-06	4.12722E-06	3.50468E-06	2.92515E-06	2.40113E-06	1.93958E-06	1.54269E-06	1.20892E-06	9.33579E-07

	31	32
1	7.13546E-07	5.19052E-07
2	8.83440E-07	6.35232E-07
3	9.98793E-07	7.13527E-07
4	8.83440E-07	6.35232E-07
5	7.13546E-07	5.19052E-07

```
NORMAL TERMINATION   (ITIME =   28 ; TIME = 2.4192E+08 )
    CPU elapsed time =  10.11     seconds
```

```
PROB. 6.0  (MR) ++ FLOW & Mass VERIFICATION - Metric System. - Cartesian COORDS
Transport of a Solute Slug Source (Beljin, 1993), Transient Flow and Mass
 4  0  0  0  1  0  1  1  0  0000          M-2
 40  5  1  1  1  1  0  1  1  10 0 0  00     M-3-1
 0  0  0  0                              M-3-2
 1 1 0 1 0.                              R0-1-1
 0.0                                     R0-2-1
 1.                                      R0-2-2
1.00E-15  1.E-15   1.    1.    1.            R1-1
1.    1.    1.    0.   4.0   1.0   1.E-50    R1-2
1690.  0.0     21.1   1000.   1000.          R1-3
 0  0  0  2                              R1-6
21.1   .001    21.1   .001                   R1-7
0.     21.1                              R1-11
33.50     21.1                            R1-11
 0  0                                    R1-12
21.1  0.0     0.     0.                   R1-16
40*5.
5*5.
33.5
2.3e-5 2.3E-5 2.3E-5 .35 0. 0. 0.                R1-20
 000000                                  R1-26-BLNK
 4  0                                    R1-27
 1 1 1 5  1 1 0                          R1-28-1
 1. 19.614e5 21.1 0.0 21.1 0.                R1-28-2
 40 40 1 5  1 1 0                        R1-28-1
 2. 0. 21.1 0. 21.1 0.                   R1-28-2
 000000 0
000000
 0  1  1                                 I-1
 2.3e-5                                  I-3
 1 1 3 3 1 1 .0004
0000000
0.                                       R1A-2
 0  0  1  0  0  0  0  0  0  00           R2-1
 1  0.5                                  R2-2
7200. 3600.  000000                      R2-12
 -1  -1  -1  -1 0 0  000030-10           R2-13
 0  0  0  0  0  0  0  0  0  0  0 0       R2-1
342144. 3600.  3600. 0. 0.  0.  342144.  3600.      R2-12
 -1   -1  1  -1  1  -1  00003 0-10           R2-13
```

0 0 0 1 0 0 0 0 0 0 0 R2-1-STOP

```
**************************************************
*                                                *
*    >>> S W I F T / 4 8 6 <<<                   *
*                                                *
**************************************************
*                                                *
*         SANDIA Waste-Isolation                 *
*          Flow and Transport in                 *
*       Porous and/or Fractured Media            *
*                                                *
*      Quality Assurance Version 2.53            *
*                                                *
*         --- Transport Equations ---            *
* Fluid free-water surface (steady or transient) *
*      Energy-temperature (transient)            *
* Dominant specie-brine (steady or transient)    *
*   Trace species-radionuclides (transient)      *
*                                                *
*           --- Code evolution ---               *
*     Intera Technologies, Inc. 1975-1982        *
*          GeoTrans, Inc. 1982-1993              *
*                                                *
*       Copyright GeoTrans, Inc. 1993            *
*                                                *
**************************************************
```

```
*** TITLE CARDS ***
------------------


*******************************************************************************
*                                                                             *
* PROB. 6.0  (MR) ++ FLOW & Mass VERIFICATION - Metric System. - Cartesian COORDS *
*                                                                             *
* Transport of a Solute Slug Source (Beljin, 1993), Transient Flow and Mass   *
*                                                                             *
*******************************************************************************


*** INTEGER CONTROL SPECIFICATION ***
-------------------------------------


*** EXECUTION CONTROL OPTIONS ***
EQUATIONS SOLVING INDEX ............. NCALL.  4
RESTART RECORD NUMBER ................ RSTST..000E+00
WELLBORE DATA KEY ................... ISURF.  0
FREE WATER SURFACE OPTION ........... IFREE.  0
PLOTTING KEYS - PRESSURE ............ NPLP .  '1
          - TEMPERATURE ......... NPLT .  0
          - CONCENTRATION ....... NPLC .  1
UNITS ARE IN (0=ENGLISH, 1=METRIC) .. IUNIT.  1
NUCLIDE MONITOR (UNIT9) OPTION ...... LBIO .  0
MAP[ij] {j: 0=NO,1=ASCII,2=BINARY) .. LMAPIT  0
      {i: 0=Datum, 1=Envr H, 2=Fresh Wat H}
MASS BALANCE AUXILIARY FILE (UNIT17). LMBAL   0
AQUIFER INFLUENCE FUNC FILE (UNIT18). LAIF .  0
PRINT REQUENCY FOR L2SOR ............ L2SORP  5

*** PROBLEM DIMENSIONS ***
NUMBER OF BLOCKS IN X-DIRECTION ..... NX ...  40
NUMBER OF BLOCKS IN Y-DIRECTION ..... NY ...  5
NUMBER OF BLOCKS IN Z-DIRECTION ..... NZ ...  1
```

```
INDEX OF RESERVOIR HETEROGENEITY .... HTG ..  1
NO OF RADIOACTIVE COMPONENTS ........ NCP ..  1
NUMBER OF ROCK TYPES ................ NRT ..  1
OUTPUT CONTROL INDEX ................ KOUT .  0
PRINT CONTROL KEY ................... PRT ..  1
MAX NO OF RADIOACTIVE SOURCE BLOCKS . NSMAX   1
MAX NO OF AQUIFER INFL FN BLOCKS .... NABLMX 10
MAX NO OF SURFACE RECHARGE BLOCKS ... NRCHMX  0
METHOD OF SOLUTION .................. METHOD  0


  *** WASTE INVENTORY TABLE ENTRIES ***
NUMBER OF INTERPOLATION TIMES ....... NTIME   0
REPOSITORY AREAL HEATING CONTROL .... KHEAT   0
NUMBER OF REPOSITORY BLOCKS ......... NREPB   0

  *** LOCAL (MATRIX) SUBSYSTEM CONTROL ***
SOLUTION CONTROL .................... KSLVD   0
NUMBER OF LOCAL ROCK TYPES .......... NRTD .  0
OUTPUT CONTROL KEY .................. KOUTD   0
```

```
*** RADIONUCLIDE DECAY CHAIN DATA ***
------------------------------------

..................................................................................................
NO MASS COMPONENT  PARENT COMP     DECAY   ADJUST   FREUNDLICH COEFFS. KAPPA (CU.M/KG)  **ETA  AND ETA
        NO   FRACTION   H LIFE (YRS) LAMDA      ROCK TYPES
                                      1
..................................................................................................

1  1            0.0000E+00  1      0.000E+00   1.000E+00


*** UTILIZATION OF COMMON ARRAY STORAGE ***
-------------------------------------------

            .......................................................
            .            .                       .      .
            . BLANK COMMON  .          LABELLED COMMON         .    .
            .-----------------.----------------------------------.   .
            . REAL  INTEGER  .           REAL          INTEGER .     .
            . ------- -------  .  -------------------------  --------- .    .
            .               .     G      G2      G3      IG  .  TOTAL .
            .               .  -------  -------  -------  -------  .  ------- .
            .               .                        .      .
CODE DIMENSIONS : .  16403    4469   .   650000  450000   700000    140000  . 1940000 .
            .               .                        .      .
DATA REQUIREMENTS: .  16403    4469   .    10212    4806     6201      2077  .  23296 .
            .               .                        .      .
            .......................................................
```

```
*** GLOBAL (FRACTURE) AND FLUID DATA ***
WATER COMPRESSIBILITY .............. CW ....  1.00000E-15  (1/PA)
ROCK COMPRESSIBILITY ............... CR ....  1.00000E-15  (1/PA)
WATER THERMAL EXPANSION FACTOR ..... CTW ...  1.00000E+00  (1/DEG.C)
WATER HEAT CAPACITY ................ CPW ...  1.00000E+00  (J/KG-DEG.C)
ROCK HEAT CAPACITY ................. CPR ...  1.00000E+00  (J/CU.M-DEG.C)
MEDIUM THERMAL COND. IN X-DIR ...... UKTX ..  1.00000E+00  (J/M-SEC-DEG.C)
MEDIUM THERMAL COND. IN Y-DIR ...... UKTY ..  1.00000E+00  (J/M-SEC-DEG.C)
MEDIUM THERMAL COND. IN Z-DIR ...... UKTZ ..  1.00000E+00  (J/M-SEC-DEG.C)
LONGITUDINAL DISPERSIVITY FACTOR ... ALPHL..  4.00000E+00  (M)
TRANSVERSE DISPERSIVITY FACTOR ..... ALPHT..  1.00000E+00  (M)
EFFECTIVE MOLECULAR DIFFUSION ...... DMEFF..  1.00000E-50  (SQ.M/SEC)
ROCK DENSITY (SOLID PARTICLE) ...... BROCK..  1.69000E+03  (KG/CU.M)
REF. PRESSURE FOR FLUID DENSITIES .. PBWR ..  0.00000E+00  (PA)
REF. TEMP. FOR FLUID DENSITIES ..... TBWR ..  2.11000E+01  (DEG.C)
FLUID DENSITY (AT C=0.0) ........... BWRN ..  1.00000E+03  (KG/CU.M)
BRINE FLUID DENSITY (AT C=1.0) ..... BWRI ..  1.00000E+03  (KG/CU.M)
```

TEMPERATURE-VISCOSITY TABLE

TEMPERATURE (DEG.C)	VISCOSITY (PA-SEC)
AQUIFER FLUID (AT C=0.0)	
2.11000E+01	1.00000E-03
SATURATED BRINE (AT C=1.0)	
2.11000E+01	1.00000E-03

DEPTH-TEMPERATURE INITIALIZATION

DEPTH (M)	TEMPERATURE (DEG.C)
0.0000E+00	21.10
33.50	21.10

```
 *** REFERENCE CONDITIONS FOR FLUID AND GLOBAL SYSTEM ***
REFERENCE FLUID TEMPERATURE ........ TO .... 2.11000E+01  (DEG.C)
INITIAL AND REFERENCE PRESSURE ..... PINIT   0.00000E+00  (PA)
REFERENCE DEPTH OF INITIAL P & T ... HINIT . 0.00000E+00  (M)
DEPTH FROM REF. PLANE TO DATUM ..... HDATUM  0.00000E+00  (M)
REFERENCE WATER DENSITY (AT C=0.0) . BW0 ... 1.00000E+03  (KG/CU.M)
REFERENCE WATER INTERNAL ENERGY .... UW0 ... 8.84578E+04  (J/KG)
REFERENCE WATER ENTHALPY ........... ETH ... 8.84578E+04  (J/KG)
```

*** GLOBAL SYSTEM GRIDDING ***

X-DIRECTION GRID BLOCK DIMENSIONS (M)

	1	2	3	4	5	6	7	8	9	10
1- 10	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
11- 20	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
21- 30	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
31- 40	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000

Y-DIRECTION GRID BLOCK DIMENSIONS (M)

	1	2	3	4	5
1- 5	5.000	5.000	5.000	5.000	5.000

Z-DIRECTION GRID BLOCK DIMENSIONS (M)

	1
1- 1	33.50

X-DIRECTION DISTANCE TO GRID BLOCK CENTER (M)

	1	2	3	4	5	6	7	8	9	10
1- 10	2.500	7.500	12.50	17.50	22.50	27.50	32.50	37.50	42.50	47.50
11- 20	52.50	57.50	62.50	67.50	72.50	77.50	82.50	87.50	92.50	97.50
21- 30	102.5	107.5	112.5	117.5	122.5	127.5	132.5	137.5	142.5	147.5
31- 40	152.5	157.5	162.5	167.5	172.5	177.5	182.5	187.5	192.5	197.5

Y-DIRECTION DISTANCE TO GRID BLOCK CENTER (M)

	1	2	3	4	5
1- 5	2.500	7.500	12.50	17.50	22.50

X-DIRECTION DISTANCE TO LEADING BLOCK EDGE (M)

	1	2	3	4	5	6	7	8	9	10
1- 10	0.0000E+00	5.000	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00
11- 20	50.00	55.00	60.00	65.00	70.00	75.00	80.00	85.00	90.00	95.00
21- 30	100.0	105.0	110.0	115.0	120.0	125.0	130.0	135.0	140.0	145.0

31- 40	150.0	155.0	160.0	165.0	170.0	175.0	180.0	185.0	190.0	195.0
41- 41	200.0									

Y-DIRECTION DISTANCE TO LEADING BLOCK EDGE (M)

	1	2	3	4	5	6
1- 6	0.0000E+00	5.000	10.00	15.00	20.00	25.00

```
*** SPECIFICATION OF HOMOGENEOUS GLOBAL SYSTEM ***
-------------------------------------------------

HYDRAULIC CONDUCTIVITY IN X-DIR .... KX .... 2.30000E-05 (M/SEC)
HYDRAULIC CONDUCTIVITY IN Y-DIR .... KY .... 2.30000E-05 (M/SEC)
HYDRAULIC CONDUCTIVITY IN Z-DIR .... KZ .... 2.30000E-05 (M/SEC)
POROSITY .......................... PHI ... 0.35000     (FRACTION)
RESERVOIR DIP IN X-DIRECTION ....... SINX .. 0.00000E+00 (SIN OF ANGLE)
RESERVOIR DIP IN Y-DIRECTION ....... SINY .. 0.00000E+00 (SIN OF ANGLE)
DEPTH TO CENTER GRID BLOCK (1,1,1) . DEPTH . 0.00000E+00 (M)
```

DEPTH OF BLOCK CENTERS BELOW REFERENCE PLANE (M)
(Measured positive downwards)

All values for this array equal 0.0000E+00

NATURAL WATER FLOW VELOCITY IN THE X-DIRECTION = 2.30000E-05 (M/SEC)

GLOBAL BOUNDARY PRESSURES (PA)

All values for this array equal 0.0000E+00

GLOBAL BOUNDARY TEMPERATURES (DEG.C)

	1	2	3	4	5	6	7	8	9	10
1	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	21.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

11	12	13	14	15	16	17	18	19	20

1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	21	22	23	24	25	26	27	28	29	30
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	31	32	33	34	35	36	37	38	39	40
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21.1000
2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21.1000
3	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21.1000
4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21.1000
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	21.1000

GLOBAL BOUNDARY CONCENTRATIONS (FRACTION)
....

All values for this array equal 0.0000E+00

*** SALT DISSOLUTION ***

(PRODUCT OF DISSOLUTION RATE AND SOLUBLE FRACTION)

ROCK TYPE	PRODUCT (1/SEC)
1	0.0000E+00

GLOBAL PORE VOLUME (M**3)
....

All values for this array equal   293.1

GLOBAL ROCK TYPES
....

All values for this array equal   1

X-DIRECTION PECLET NO (DELX/ALPHAL)
....

All values for this array equal   1.250

Y-DIRECTION PECLET NO (DELY/ALPHAL)
....

All values for this array equal   1.250

GLOBAL X-DIRECTION TRANSMISSIVITY (SQ.M/SEC)

....

All values for this array equal 7.7050E-04

GLOBAL Y-DIRECTION TRANSMISSIVITY (SQ.M/SEC)

....

All values for this array equal 7.7050E-04

GRID BLOCK CENTER ELEVATION ABOVE DATUM PLANE (M)
(Measured positive upwards)

....

All values for this array equal 0.0000E+00

GRID BLOCK THICKNESS (M)

....

All values for this array equal 33.50

INITIAL GLOBAL PRESSURE AT ELEVATION H (PA)

....

1 2 3 4 5 6 7 8 9 10

1	0.00000E+00	-49035.	-98070.	-1.47105E+05	-1.96140E+05	-2.45175E+05	-2.94210E+05	-3.43245E+05	-3.92280E+05	-4.41315E+05
2	0.00000E+00	-49035.	-98070.	-1.47105E+05	-1.96140E+05	-2.45175E+05	-2.94210E+05	-3.43245E+05	-3.92280E+05	-4.41315E+05
3	0.00000E+00	-49035.	-98070.	-1.47105E+05	-1.96140E+05	-2.45175E+05	-2.94210E+05	-3.43245E+05	-3.92280E+05	-4.41315E+05
4	0.00000E+00	-49035.	-98070.	-1.47105E+05	-1.96140E+05	-2.45175E+05	-2.94210E+05	-3.43245E+05	-3.92280E+05	-4.41315E+05
5	0.00000E+00	-49035.	-98070.	-1.47105E+05	-1.96140E+05	-2.45175E+05	-2.94210E+05	-3.43245E+05	-3.92280E+05	-4.41315E+05

	11	12	13	14	15	16	17	18	19	20
1	-4.90350E+05	-5.39385E+05	-5.88420E+05	-6.37455E+05	-6.86490E+05	-7.35525E+05	-7.84560E+05	-8.33595E+05	-8.82630E+05	-9.31665E+05
2	-4.90350E+05	-5.39385E+05	-5.88420E+05	-6.37455E+05	-6.86490E+05	-7.35525E+05	-7.84560E+05	-8.33595E+05	-8.82630E+05	-9.31665E+05
3	-4.90350E+05	-5.39385E+05	-5.88420E+05	-6.37455E+05	-6.86490E+05	-7.35525E+05	-7.84560E+05	-8.33595E+05	-8.82630E+05	-9.31665E+05
4	-4.90350E+05	-5.39385E+05	-5.88420E+05	-6.37455E+05	-6.86490E+05	-7.35525E+05	-7.84560E+05	-8.33595E+05	-8.82630E+05	-9.31665E+05
5	-4.90350E+05	-5.39385E+05	-5.88420E+05	-6.37455E+05	-6.86490E+05	-7.35525E+05	-7.84560E+05	-8.33595E+05	-8.82630E+05	-9.31665E+05

	21	22	23	24	25	26	27	28	29	30
1	-9.80700E+05	-1.02973E+06	-1.07877E+06	-1.12780E+06	-1.17684E+06	-1.22587E+06	-1.27491E+06	-1.32394E+06	-1.37298E+06	-1.42201E+06
2	-9.80700E+05	-1.02973E+06	-1.07877E+06	-1.12780E+06	-1.17684E+06	-1.22587E+06	-1.27491E+06	-1.32394E+06	-1.37298E+06	-1.42201E+06
3	-9.80700E+05	-1.02973E+06	-1.07877E+06	-1.12780E+06	-1.17684E+06	-1.22587E+06	-1.27491E+06	-1.32394E+06	-1.37298E+06	-1.42201E+06
4	-9.80700E+05	-1.02973E+06	-1.07877E+06	-1.12780E+06	-1.17684E+06	-1.22587E+06	-1.27491E+06	-1.32394E+06	-1.37298E+06	-1.42201E+06
5	-9.80700E+05	-1.02973E+06	-1.07877E+06	-1.12780E+06	-1.17684E+06	-1.22587E+06	-1.27491E+06	-1.32394E+06	-1.37298E+06	-1.42201E+06

	31	32	33	34	35	36	37	38	39	40
1	-1.47105E+06	-1.52008E+06	-1.56912E+06	-1.61815E+06	-1.66719E+06	-1.71622E+06	-1.76526E+06	-1.81429E+06	-1.86333E+06	-1.91236E+06
2	-1.47105E+06	-1.52008E+06	-1.56912E+06	-1.61815E+06	-1.66719E+06	-1.71622E+06	-1.76526E+06	-1.81429E+06	-1.86333E+06	-1.91236E+06
3	-1.47105E+06	-1.52008E+06	-1.56912E+06	-1.61815E+06	-1.66719E+06	-1.71622E+06	-1.76526E+06	-1.81429E+06	-1.86333E+06	-1.91236E+06
4	-1.47105E+06	-1.52008E+06	-1.56912E+06	-1.61815E+06	-1.66719E+06	-1.71622E+06	-1.76526E+06	-1.81429E+06	-1.86333E+06	-1.91236E+06
5	-1.47105E+06	-1.52008E+06	-1.56912E+06	-1.61815E+06	-1.66719E+06	-1.71622E+06	-1.76526E+06	-1.81429E+06	-1.86333E+06	-1.91236E+06

INITIAL GLOBAL PRESSURE AT DATUM ELEVATION (PA)

```
      1       2       3       4       5       6       7       8       9      10

 1 0.00000E+00 -49035.  -98070.  -1.47105E+05-1.96140E+05-2.45175E+05-2.94210E+05-3.43245E+05-3.92280E+05-4.41315E+05
 2 0.00000E+00 -49035.  -98070.  -1.47105E+05-1.96140E+05-2.45175E+05-2.94210E+05-3.43245E+05-3.92280E+05-4.41315E+05
 3 0.00000E+00 -49035.  -98070.  -1.47105E+05-1.96140E+05-2.45175E+05-2.94210E+05-3.43245E+05-3.92280E+05-4.41315E+05
 4 0.00000E+00 -49035.  -98070.  -1.47105E+05-1.96140E+05-2.45175E+05-2.94210E+05-3.43245E+05-3.92280E+05-4.41315E+05
 5 0.00000E+00 -49035.  -98070.  -1.47105E+05-1.96140E+05-2.45175E+05-2.94210E+05-3.43245E+05-3.92280E+05-4.41315E+05

     11      12      13      14      15      16      17      18      19      20

 1 -4.90350E+05-5.39385E+05-5.88420E+05-6.37455E+05-6.86490E+05-7.35525E+05-7.84560E+05-8.33595E+05-8.82630E+05-9.31665E+05
 2 -4.90350E+05-5.39385E+05-5.88420E+05-6.37455E+05-6.86490E+05-7.35525E+05-7.84560E+05-8.33595E+05-8.82630E+05-9.31665E+05
 3 -4.90350E+05-5.39385E+05-5.88420E+05-6.37455E+05-6.86490E+05-7.35525E+05-7.84560E+05-8.33595E+05-8.82630E+05-9.31665E+05
 4 -4.90350E+05-5.39385E+05-5.88420E+05-6.37455E+05-6.86490E+05-7.35525E+05-7.84560E+05-8.33595E+05-8.82630E+05-9.31665E+05
 5 -4.90350E+05-5.39385E+05-5.88420E+05-6.37455E+05-6.86490E+05-7.35525E+05-7.84560E+05-8.33595E+05-8.82630E+05-9.31665E+05

     21      22      23      24      25      26      27      28      29      30

 1 -9.80700E+05-1.02973E+06-1.07877E+06-1.12780E+06-1.17684E+06-1.22587E+06-1.27491E+06-1.32394E+06-1.37298E+06-1.42201E+06
 2 -9.80700E+05-1.02973E+06-1.07877E+06-1.12780E+06-1.17684E+06-1.22587E+06-1.27491E+06-1.32394E+06-1.37298E+06-1.42201E+06
 3 -9.80700E+05-1.02973E+06-1.07877E+06-1.12780E+06-1.17684E+06-1.22587E+06-1.27491E+06-1.32394E+06-1.37298E+06-1.42201E+06
 4 -9.80700E+05-1.02973E+06-1.07877E+06-1.12780E+06-1.17684E+06-1.22587E+06-1.27491E+06-1.32394E+06-1.37298E+06-1.42201E+06
 5 -9.80700E+05-1.02973E+06-1.07877E+06-1.12780E+06-1.17684E+06-1.22587E+06-1.27491E+06-1.32394E+06-1.37298E+06-1.42201E+06

     31      32      33      34      35      36      37      38      39      40

 1 -1.47105E+06-1.52008E+06-1.56912E+06-1.61815E+06-1.66719E+06-1.71622E+06-1.76526E+06-1.81429E+06-1.86333E+06-1.91236E+06
 2 -1.47105E+06-1.52008E+06-1.56912E+06-1.61815E+06-1.66719E+06-1.71622E+06-1.76526E+06-1.81429E+06-1.86333E+06-1.91236E+06
 3 -1.47105E+06-1.52008E+06-1.56912E+06-1.61815E+06-1.66719E+06-1.71622E+06-1.76526E+06-1.81429E+06-1.86333E+06-1.91236E+06
 4 -1.47105E+06-1.52008E+06-1.56912E+06-1.61815E+06-1.66719E+06-1.71622E+06-1.76526E+06-1.81429E+06-1.86333E+06-1.91236E+06
```

5 -1.47105E+06-1.52008E+06-1.56912E+06-1.61815E+06-1.66719E+06-1.71622E+06-1.76526E+06-1.81429E+06-1.86333E+06-1.91236E+06

INITIAL GLOBAL TEMPERATURES (DEG.C)
....

All values for this array equal 21.10

INITIAL GLOBAL BRINE CONCENTRATIONS (FRACTION)
....

All values for this array equal 0.0000E+00

COMP- 1 INITIAL GLOBAL CONCENTRATIONS (FRACTION)
....

All values for this array equal 0.0000E+00

```
*** STATE VARIABLE INITIALIZATION ***
-------------------------------------

        AMOUNT IN-PLACE
        ...............
      WATER  5.86250E+07 (KG)
     ENERGY  5.18584E+12 (J)
      BRINE  0.00000E+00 (KG)
COMPONENT NO 1   117.25     (KG)
```

```
*** RECURRENT DATA SPECIFICATION BEGINNING AT TIME =  0.0000E+00 (SECS)  ***
----------------------------------------------------------------------------

              INPUT CONTROL OPTIONS
  ..........................................................
  INDQ IWELL IMETH ITHRU IRSS IPROD IOPT INDT ICLL IRCH ICHCR
  ..........................................................
   0    0     1     0     0    0     0    0    0    0    0

            METHOD = 1      WT FACTOR =  0.5

 NOTE: FOR DIRECT D4 SOLUTION, THE A-ARRAY (G3)IN LABELLED COMMON GAMMA
    IS DIMENSIONED AT  700000 WORDS  BUT REQUIRES ONLY   6201 WORDS


           TIME STEPPING AND OUTPUT CONTROL OPTIONS
 ..................................................................
   TCHG      DT  IO1 IO2 IO3 IO4 IO5 IO6 IO8 RSTWR MAP MDAT IIPRT IO5D IO8D IIPRTD
 ..................................................................

7.200E+03 3.600E+03  -1  -1  -1  -1   0   0   0   0   0   0   3   0  -1   0

      RADIONUCLIDE TIME STEP CONTROL - MAX CONC. CHANGE PER TIME STEP =  0.950
 PRESSURE EQUATION AFTER OUTER ITERATION NO.    1        RELATIVE CHANGE IS  79.00
```

ELAPSED SIMULATION TIME 3600. (SECS)
****

GLOBAL X-DIR - DARCY VELOCITY (M/SEC)
....

All values for this array equal 2.3000E-05

COURANT NUMBER - X-DIR (CU. M/SEC)
....

All values for this array equal 4.7314E-02

GLOBAL Y-DIR - DARCY VELOCITY (M/SEC)
....

	1	2	3	4	5	6	7	8	9	10
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	1.09210E-19	0.00000E+00	0.00000E+00	0.00000E+00
3	-1.09210E-19	-2.18420E-19	0.00000E+00	-2.18420E-19	0.00000E+00	0.00000E+00	0.00000E+00	1.09210E-19	1.09210E-19	4.36839E-19
4	1.09210E-19	2.18420E-19	2.18420E-19	3.27630E-19	1.09210E-19	2.18420E-19	2.18420E-19	0.00000E+00	1.09210E-19	-2.18420E-19
5	1.09210E-19	2.18420E-19	0.00000E+00	0.00000E+00	1.09210E-19	2.18420E-19	0.00000E+00	2.18420E-19	0.00000E+00	0.00000E+00

11 12 13 14 15 16 17 18 19 20

```
1  0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00
2  0.00000E+00 1.09210E-19 0.00000E+00-1.09210E-19 0.00000E+00 1.09210E-19 2.18420E-19 1.09210E-19 0.00000E+00-1.09210E-19
3  2.18420E-19 2.18420E-19 1.09210E-19 0.00000E+00 1.09210E-19 1.09210E-19 0.00000E+00 0.00000E+00-1.09210E-19 0.00000E+00
4  0.00000E+00-1.09210E-19 0.00000E+00 0.00000E+00-1.09210E-19-2.18420E-19-1.09210E-19-1.09210E-19 0.00000E+00-1.09210E-19
5 -1.09210E-19-1.09210E-19 0.00000E+00 2.18420E-19 1.09210E-19 0.00000E+00-1.09210E-19-1.09210E-19-1.09210E-19-1.09210E-19

      21        22        23        24        25        26        27        28        29        30

1  0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00
2 -5.46049E-20-5.46049E-20 5.46049E-20 0.00000E+00-5.46049E-20-1.09210E-19 0.00000E+00 0.00000E+00 0.00000E+00 2.73025E-20
3 -5.46049E-20 5.46049E-20 0.00000E+00 5.46049E-20 0.00000E+00 5.46049E-20 0.00000E+00 5.46049E-20 0.00000E+00 0.00000E+00
4  0.00000E+00-1.09210E-19-1.09210E-19-5.46049E-20-1.09210E-19-5.46049E-20-5.46049E-20-5.46049E-20 0.00000E+00 2.73025E-20
5 -1.09210E-19-1.63815E-19-1.09210E-19-5.46049E-20 5.46049E-20 5.46049E-20 5.46049E-20 0.00000E+00 5.46049E-20 2.73025E-20

      31        32        33        34        35        36        37        38        39        40

1  0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00
2 -5.46049E-20-8.19074E-20-5.46049E-20 0.00000E+00 0.00000E+00 0.00000E+00-1.36512E-20 0.00000E+00 0.00000E+00-3.41281E-21
3  2.73025E-20 2.73025E-20 2.73025E-20 0.00000E+00 2.73025E-20 1.36512E-20-2.73025E-20-2.04768E-20-1.36512E-20-3.41281E-21
4  0.00000E+00 0.00000E+00-2.73025E-20 0.00000E+00 0.00000E+00-1.36512E-20 0.00000E+00 6.82562E-21 6.82562E-21 1.70640E-21
5  5.46049E-20 5.46049E-20 5.46049E-20 0.00000E+00-2.73025E-20 0.00000E+00 1.36512E-20 0.00000E+00 0.00000E+00 1.70640E-21
```

COURANT NUMBER - Y-DIR (CU. M/SEC)
....

```
      1         2         3         4         5         6         7         8         9         10

1  0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00
2  0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 2.24660E-16 0.00000E+00 0.00000E+00 0.00000E+00
3  2.24660E-16 4.49321E-16 0.00000E+00 4.49321E-16 0.00000E+00 0.00000E+00 0.00000E+00 2.24660E-16 2.24660E-16 8.98641E-16
4  2.24660E-16 4.49321E-16 4.49321E-16 6.73981E-16 2.24660E-16 4.49321E-16 4.49321E-16 0.00000E+00 2.24660E-16 4.49321E-16
```

5	2.24660E-16	4.49321E-16	0.00000E+00	0.00000E+00	2.24660E-16	4.49321E-16	0.00000E+00	4.49321E-16	0.00000E+00	0.00000E+00

	11	12	13	14	15	16	17	18	19	20
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	0.00000E+00	2.24660E-16	0.00000E+00	2.24660E-16	0.00000E+00	2.24660E-16	4.49321E-16	2.24660E-16	0.00000E+00	2.24660E-16
3	4.49321E-16	4.49321E-16	2.24660E-16	0.00000E+00	2.24660E-16	2.24660E-16	0.00000E+00	0.00000E+00	2.24660E-16	0.00000E+00
4	0.00000E+00	2.24660E-16	0.00000E+00	0.00000E+00	2.24660E-16	4.49321E-16	2.24660E-16	2.24660E-16	0.00000E+00	2.24660E-16
5	2.24660E-16	2.24660E-16	0.00000E+00	4.49321E-16	2.24660E-16	0.00000E+00	2.24660E-16	2.24660E-16	2.24660E-16	2.24660E-16

	21	22	23	24	25	26	27	28	29	30
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	1.12330E-16	1.12330E-16	1.12330E-16	0.00000E+00	1.12330E-16	2.24660E-16	0.00000E+00	0.00000E+00	0.00000E+00	5.61651E-17
3	1.12330E-16	1.12330E-16	0.00000E+00	1.12330E-16	0.00000E+00	1.12330E-16	0.00000E+00	1.12330E-16	0.00000E+00	0.00000E+00
4	0.00000E+00	2.24660E-16	2.24660E-16	1.12330E-16	2.24660E-16	1.12330E-16	1.12330E-16	1.12330E-16	0.00000E+00	5.61651E-17
5	2.24660E-16	3.36990E-16	2.24660E-16	1.12330E-16	1.12330E-16	1.12330E-16	1.12330E-16	0.00000E+00	1.12330E-16	5.61651E-17

	31	32	33	34	35	36	37	38	39	40
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	1.12330E-16	1.68495E-16	1.12330E-16	0.00000E+00	0.00000E+00	0.00000E+00	2.80825E-17	0.00000E+00	0.00000E+00	7.02063E-18
3	5.61651E-17	5.61651E-17	5.61651E-17	0.00000E+00	5.61651E-17	2.80825E-17	5.61651E-17	4.21238E-17	2.80825E-17	7.02063E-18
4	0.00000E+00	0.00000E+00	5.61651E-17	0.00000E+00	0.00000E+00	2.80825E-17	0.00000E+00	1.40413E-17	1.40413E-17	3.51032E-18
5	1.12330E-16	1.12330E-16	1.12330E-16	0.00000E+00	5.61651E-17	0.00000E+00	2.80825E-17	0.00000E+00	0.00000E+00	3.51032E-18

SUMMATION OF FLUID TRANSFER IN X-DIRECTION ACROSS Y-Z PLANE
....

	------ VOLUMETRIC -----		--------- MASS --------	
INTERFACE	POSITIVE	NEGATIVE	POSITIVE	NEGATIVE
(-1/2:+1/2)	(CU. M/SEC)	(CU. M/SEC)	(KG/SEC)	(KG/SEC)

1: 2	1.92625E-02	0.00000E+00	19.263	0.00000E+00
2: 3	1.92625E-02	0.00000E+00	19.263	0.00000E+00
3: 4	1.92625E-02	0.00000E+00	19.263	0.00000E+00
4: 5	1.92625E-02	0.00000E+00	19.263	0.00000E+00
5: 6	1.92625E-02	0.00000E+00	19.263	0.00000E+00
6: 7	1.92625E-02	0.00000E+00	19.263	0.00000E+00
7: 8	1.92625E-02	0.00000E+00	19.263	0.00000E+00
8: 9	1.92625E-02	0.00000E+00	19.263	0.00000E+00
9: 10	1.92625E-02	0.00000E+00	19.263	0.00000E+00
10: 11	1.92625E-02	0.00000E+00	19.263	0.00000E+00
11: 12	1.92625E-02	0.00000E+00	19.263	0.00000E+00
12: 13	1.92625E-02	0.00000E+00	19.263	0.00000E+00
13: 14	1.92625E-02	0.00000E+00	19.263	0.00000E+00
14: 15	1.92625E-02	0.00000E+00	19.263	0.00000E+00
15: 16	1.92625E-02	0.00000E+00	19.263	0.00000E+00
16: 17	1.92625E-02	0.00000E+00	19.263	0.00000E+00
17: 18	1.92625E-02	0.00000E+00	19.263	0.00000E+00
18: 19	1.92625E-02	0.00000E+00	19.263	0.00000E+00
19: 20	1.92625E-02	0.00000E+00	19.263	0.00000E+00
20: 21	1.92625E-02	0.00000E+00	19.263	0.00000E+00
21: 22	1.92625E-02	0.00000E+00	19.263	0.00000E+00
22: 23	1.92625E-02	0.00000E+00	19.263	0.00000E+00
23: 24	1.92625E-02	0.00000E+00	19.263	0.00000E+00
24: 25	1.92625E-02	0.00000E+00	19.263	0.00000E+00
25: 26	1.92625E-02	0.00000E+00	19.263	0.00000E+00
26: 27	1.92625E-02	0.00000E+00	19.263	0.00000E+00
27: 28	1.92625E-02	0.00000E+00	19.263	0.00000E+00
28: 29	1.92625E-02	0.00000E+00	19.263	0.00000E+00
29: 30	1.92625E-02	0.00000E+00	19.263	0.00000E+00
30: 31	1.92625E-02	0.00000E+00	19.263	0.00000E+00
31: 32	1.92625E-02	0.00000E+00	19.263	0.00000E+00
32: 33	1.92625E-02	0.00000E+00	19.263	0.00000E+00
33: 34	1.92625E-02	0.00000E+00	19.263	0.00000E+00
34: 35	1.92625E-02	0.00000E+00	19.263	0.00000E+00
35: 36	1.92625E-02	0.00000E+00	19.263	0.00000E+00
36: 37	1.92625E-02	0.00000E+00	19.263	0.00000E+00
37: 38	1.92625E-02	0.00000E+00	19.263	0.00000E+00
38: 39	1.92625E-02	0.00000E+00	19.263	0.00000E+00
39: 40	1.92625E-02	0.00000E+00	19.263	0.00000E+00

SUMMATION OF FLUID TRANSFER IN Y-DIRECTION ACROSS X-Z PLANE

INTERFACE (-1/2:+1/2)	------ VOLUMETRIC ----- POSITIVE (CU. M/SEC)	NEGATIVE (CU. M/SEC)	--------- MASS -------- POSITIVE (KG/SEC)	NEGATIVE (KG/SEC)
1: 2	1.23475E-16	-1.17187E-16	1.23475E-13	-1.17187E-13
2: 3	2.94969E-16	-1.29763E-16	2.94969E-13	-1.29763E-13
3: 4	2.63243E-16	-2.62957E-16	2.63243E-13	-2.62957E-13
4: 5	2.72389E-16	-1.87500E-16	2.72389E-13	-1.87500E-13

GLOBAL X-DIR - VOLUMETRIC FLUX (CU. M/SEC)

All values for this array equal 3.8525E-03

GLOBAL Y-DIR - VOLUMETRIC FLUX (CU. M/SEC)

	1	2	3	4	5	6	7	8	9	10
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	1.82926E-17	0.00000E+00	0.00000E+00	0.00000E+00
3	-1.82926E-17	-3.65853E-17	0.00000E+00	-3.65853E-17	0.00000E+00	0.00000E+00	0.00000E+00	1.82926E-17	1.82926E-17	7.31706E-17
4	1.82926E-17	3.65853E-17	3.65853E-17	5.48779E-17	1.82926E-17	3.65853E-17	3.65853E-17	0.00000E+00	1.82926E-17	-3.65853E-17
5	1.82926E-17	3.65853E-17	0.00000E+00	0.00000E+00	1.82926E-17	3.65853E-17	0.00000E+00	3.65853E-17	0.00000E+00	0.00000E+00

11 12 13 14 15 16 17 18 19 20

```
1  0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00
2  0.00000E+00 1.82926E-17 0.00000E+00-1.82926E-17 0.00000E+00 1.82926E-17 3.65853E-17 1.82926E-17 0.00000E+00-1.82926E-17
3  3.65853E-17 3.65853E-17 1.82926E-17 0.00000E+00 1.82926E-17 1.82926E-17 0.00000E+00 0.00000E+00-1.82926E-17 0.00000E+00
4  0.00000E+00-1.82926E-17 0.00000E+00 0.00000E+00-1.82926E-17-3.65853E-17-1.82926E-17-1.82926E-17 0.00000E+00-1.82926E-17
5 -1.82926E-17-1.82926E-17 0.00000E+00 3.65853E-17 1.82926E-17 0.00000E+00-1.82926E-17-1.82926E-17-1.82926E-17-1.82926E-17

     21     22     23     24     25     26     27     28     29     30

1  0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00
2 -9.14632E-18-9.14632E-18 9.14632E-18 0.00000E+00-9.14632E-18-1.82926E-17 0.00000E+00 0.00000E+00 0.00000E+00 4.57316E-18
3 -9.14632E-18 9.14632E-18 0.00000E+00 9.14632E-18 0.00000E+00 9.14632E-18 0.00000E+00 9.14632E-18 0.00000E+00 0.00000E+00
4  0.00000E+00-1.82926E-17-1.82926E-17-9.14632E-18-1.82926E-17-9.14632E-18-9.14632E-18-9.14632E-18 0.00000E+00 4.57316E-18
5 -1.82926E-17-2.74390E-17-1.82926E-17-9.14632E-18 9.14632E-18 9.14632E-18 9.14632E-18 0.00000E+00 9.14632E-18 4.57316E-18

     31     32     33     34     35     36     37     38     39     40

1  0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00 0.00000E+00
2 -9.14632E-18-1.37195E-17-9.14632E-18 0.00000E+00 0.00000E+00 0.00000E+00-2.28658E-18 0.00000E+00 0.00000E+00-5.71645E-19
3  4.57316E-18 4.57316E-18 4.57316E-18 0.00000E+00 4.57316E-18 2.28658E-18-4.57316E-18-3.42987E-18-2.28658E-18-5.71645E-19
4  0.00000E+00 0.00000E+00-4.57316E-18 0.00000E+00 0.00000E+00-2.28658E-18 0.00000E+00 1.14329E-18 1.14329E-18 2.85823E-19
5  9.14632E-18 9.14632E-18 9.14632E-18 0.00000E+00-4.57316E-18 0.00000E+00 2.28658E-18 0.00000E+00 0.00000E+00 2.85823E-19
```

GLOBAL X-DIR - FLUID MASS FLUX (KG/SEC)
....

All values for this array equal 3.853

GLOBAL Y-DIR - FLUID MASS FLUX (KG/SEC)
....

	1	2	3	4	5	6	7	8	9	10
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	1.82926E-14	0.00000E+00	0.00000E+00	0.00000E+00
3	-1.82926E-14	-3.65853E-14	0.00000E+00	-3.65853E-14	0.00000E+00	0.00000E+00	0.00000E+00	1.82926E-14	1.82926E-14	7.31706E-14
4	1.82926E-14	3.65853E-14	3.65853E-14	5.48779E-14	1.82926E-14	3.65853E-14	3.65853E-14	0.00000E+00	1.82926E-14	-3.65853E-14
5	1.82926E-14	3.65853E-14	0.00000E+00	0.00000E+00	1.82926E-14	3.65853E-14	0.00000E+00	3.65853E-14	0.00000E+00	0.00000E+00

	11	12	13	14	15	16	17	18	19	20
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	0.00000E+00	1.82926E-14	0.00000E+00	-1.82926E-14	0.00000E+00	1.82926E-14	3.65853E-14	1.82926E-14	0.00000E+00	-1.82926E-14
3	3.65853E-14	3.65853E-14	1.82926E-14	0.00000E+00	1.82926E-14	1.82926E-14	0.00000E+00	0.00000E+00	-1.82926E-14	0.00000E+00
4	0.00000E+00	-1.82926E-14	0.00000E+00	0.00000E+00	-1.82926E-14	-3.65853E-14	-1.82926E-14	-1.82926E-14	0.00000E+00	-1.82926E-14
5	-1.82926E-14	-1.82926E-14	0.00000E+00	3.65853E-14	1.82926E-14	0.00000E+00	-1.82926E-14	-1.82926E-14	-1.82926E-14	-1.82926E-14

	21	22	23	24	25	26	27	28	29	30
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	-9.14632E-15	-9.14632E-15	9.14632E-15	0.00000E+00	-9.14632E-15	-1.82926E-14	0.00000E+00	0.00000E+00	0.00000E+00	4.57316E-15
3	-9.14632E-15	9.14632E-15	0.00000E+00	9.14632E-15	0.00000E+00	9.14632E-15	0.00000E+00	9.14632E-15	0.00000E+00	0.00000E+00
4	0.00000E+00	-1.82926E-14	-1.82926E-14	-9.14632E-15	-1.82926E-14	-9.14632E-15	-9.14632E-15	-9.14632E-15	0.00000E+00	4.57316E-15
5	-1.82926E-14	-2.74390E-14	-1.82926E-14	-9.14632E-15	9.14632E-15	9.14632E-15	9.14632E-15	0.00000E+00	9.14632E-15	4.57316E-15

	31	32	33	34	35	36	37	38	39	40
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00
2	-9.14632E-15	-1.37195E-14	-9.14632E-15	0.00000E+00	0.00000E+00	0.00000E+00	-2.28658E-15	0.00000E+00	0.00000E+00	-5.71645E-16
3	4.57316E-15	4.57316E-15	4.57316E-15	0.00000E+00	4.57316E-15	2.28658E-15	-4.57316E-15	-3.42987E-15	-2.28658E-15	-5.71645E-16
4	0.00000E+00	0.00000E+00	-4.57316E-15	0.00000E+00	0.00000E+00	-2.28658E-15	0.00000E+00	1.14329E-15	1.14329E-15	2.85823E-16
5	9.14632E-15	9.14632E-15	9.14632E-15	0.00000E+00	-4.57316E-15	0.00000E+00	2.28658E-15	0.00000E+00	0.00000E+00	2.85823E-16

GLOBAL DENSITY - (KG/CU.M)
....

All values for this array equal 1000.

GLOBAL VISCOSITY - (PA-SEC)
....

All values for this array equal 1.0000E-03

GLOBAL ENTHALPY - (J/KG)
....

	1	2	3	4	5	6	7	8	9	10
1	88458.	88409.	88360.	88311.	88262.	88213.	88164.	88115.	88066.	88017.
2	88458.	88409.	88360.	88311.	88262.	88213.	88164.	88115.	88066.	88017.
3	88458.	88409.	88360.	88311.	88262.	88213.	88164.	88115.	88066.	88017.
4	88458.	88409.	88360.	88311.	88262.	88213.	88164.	88115.	88066.	88017.
5	88458.	88409.	88360.	88311.	88262.	88213.	88164.	88115.	88066.	88017.

	11	12	13	14	15	16	17	18	19	20
1	87967.	87918.	87869.	87820.	87771.	87722.	87673.	87624.	87575.	87526.
2	87967.	87918.	87869.	87820.	87771.	87722.	87673.	87624.	87575.	87526.
3	87967.	87918.	87869.	87820.	87771.	87722.	87673.	87624.	87575.	87526.

4	87967.	87918.	87869.	87820.	87771.	87722.	87673.	87624.	87575.	87526.
5	87967.	87918.	87869.	87820.	87771.	87722.	87673.	87624.	87575.	87526.

	21	22	23	24	25	26	27	28	29	30
1	87477.	87428.	87379.	87330.	87281.	87232.	87183.	87134.	87085.	87036.
2	87477.	87428.	87379.	87330.	87281.	87232.	87183.	87134.	87085.	87036.
3	87477.	87428.	87379.	87330.	87281.	87232.	87183.	87134.	87085.	87036.
4	87477.	87428.	87379.	87330.	87281.	87232.	87183.	87134.	87085.	87036.
5	87477.	87428.	87379.	87330.	87281.	87232.	87183.	87134.	87085.	87036.

	31	32	33	34	35	36	37	38	39	40
1	86987.	86938.	86889.	86840.	86791.	86742.	86693.	86644.	86594.	86545.
2	86987.	86938.	86889.	86840.	86791.	86742.	86693.	86644.	86594.	86545.
3	86987.	86938.	86889.	86840.	86791.	86742.	86693.	86644.	86594.	86545.
4	86987.	86938.	86889.	86840.	86791.	86742.	86693.	86644.	86594.	86545.
5	86987.	86938.	86889.	86840.	86791.	86742.	86693.	86644.	86594.	86545.

GLOBAL X-DIR - FLOW TRANSMISSIBILITY - (KG/PA-SEC)

....

All values for this array equal 7.8566E-05

GLOBAL Y-DIR - FLOW TRANSMISSIBILITY - (KG/PA-SEC)

....

All values for this array equal 7.8566E-05

GLOBAL X-DIR - DISPERSIVITY - (SQ.M/SEC)
....

All values for this array equal 9.2000E-05

GLOBAL Y-DIR - DISPERSIVITY - (SQ.M/SEC)
....

All values for this array equal 2.3000E-05

GLOBAL XY-DIR - CROSS DISPERSIVITY - (SQ.M/SEC)
....

	1	2	3	4	5	6	7	8	9	10
1	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	0.00000E+00	3.27630E-19	0.00000E+00	0.00000E+00	0.00000E+00
2	3.27630E-19	6.55259E-19	0.00000E+00	6.55259E-19	0.00000E+00	0.00000E+00	3.27630E-19	3.27630E-19	3.27630E-19	1.31052E-18
3	3.27630E-19	6.55259E-19	6.55259E-19	8.19074E-19	3.27630E-19	6.55259E-19	6.55259E-19	3.27630E-19	3.27630E-19	9.82889E-19
4	3.27630E-19	6.55259E-19	6.55259E-19	9.82889E-19	3.27630E-19	6.55259E-19	6.55259E-19	6.55259E-19	3.27630E-19	6.55259E-19
5	3.27630E-19	6.55259E-19	0.00000E+00	0.00000E+00	3.27630E-19	6.55259E-19	0.00000E+00	6.55259E-19	0.00000E+00	0.00000E+00

	11	12	13	14	15	16	17	18	19	20
1	0.00000E+00	3.27630E-19	0.00000E+00	3.27630E-19	0.00000E+00	3.27630E-19	6.55259E-19	3.27630E-19	0.00000E+00	3.27630E-19
2	6.55259E-19	4.91444E-19	3.27630E-19	3.27630E-19	3.27630E-19	3.27630E-19	6.55259E-19	3.27630E-19	3.27630E-19	3.27630E-19
3	6.55259E-19	4.91444E-19	3.27630E-19	0.00000E+00	3.27630E-19	4.91444E-19	3.27630E-19	3.27630E-19	3.27630E-19	3.27630E-19

4	3.27630E-19	3.27630E-19	0.00000E+00	6.55259E-19	3.27630E-19	6.55259E-19	3.27630E-19	3.27630E-19	3.27630E-19	3.27630E-19
5	3.27630E-19	3.27630E-19	0.00000E+00	6.55259E-19	3.27630E-19	0.00000E+00	3.27630E-19	3.27630E-19	3.27630E-19	3.27630E-19

	21	22	23	24	25	26	27	28	29	30
1	1.63815E-19	1.63815E-19	1.63815E-19	0.00000E+00	1.63815E-19	3.27630E-19	0.00000E+00	0.00000E+00	0.00000E+00	8.19074E-20
2	1.63815E-19	1.63815E-19	1.63815E-19	1.63815E-19	1.63815E-19	2.45722E-19	0.00000E+00	1.63815E-19	0.00000E+00	8.19074E-20
3	1.63815E-19	2.45722E-19	3.27630E-19	1.63815E-19	3.27630E-19	1.63815E-19	1.63815E-19	1.63815E-19	0.00000E+00	8.19074E-20
4	3.27630E-19	4.09537E-19	3.27630E-19	1.63815E-19	2.45722E-19	1.63815E-19	1.63815E-19	1.63815E-19	1.63815E-19	8.19074E-20
5	3.27630E-19	4.91444E-19	3.27630E-19	1.63815E-19	1.63815E-19	1.63815E-19	1.63815E-19	0.00000E+00	1.63815E-19	8.19074E-20

	31	32	33	34	35	36	37	38	39	40
1	1.63815E-19	2.45722E-19	1.63815E-19	0.00000E+00	0.00000E+00	0.00000E+00	4.09537E-20	0.00000E+00	0.00000E+00	1.02384E-20
2	1.22861E-19	1.63815E-19	1.22861E-19	0.00000E+00	8.19074E-20	4.09537E-20	6.14305E-20	6.14305E-20	4.09537E-20	1.02384E-20
3	8.19074E-20	8.19074E-20	8.19074E-20	0.00000E+00	8.19074E-20	4.09537E-20	8.19074E-20	4.09537E-20	3.07153E-20	7.67882E-21
4	1.63815E-19	1.63815E-19	1.22861E-19	0.00000E+00	8.19074E-20	4.09537E-20	4.09537E-20	2.04768E-20	2.04768E-20	5.11921E-21
5	1.63815E-19	1.63815E-19	1.63815E-19	0.00000E+00	8.19074E-20	0.00000E+00	4.09537E-20	0.00000E+00	0.00000E+00	5.11921E-21

GLOBAL X-DIR - HEAT TRANSMISSIBILITY - (J/DEG.C-SEC)

....

All values for this array equal 36.58

GLOBAL X-DIR - DIFF TRANSMISSIBILITY - (KG/SEC)

....

All values for this array equal 3.082

```
GLOBAL Y-DIR - HEAT TRANSMISSIBILITY - (J/DEG.C-SEC)
...................................................

  All values for this array equal   34.27


GLOBAL Y-DIR - DIFF TRANSMISSIBILITY - (KG/SEC)
............................................

  All values for this array equal  0.7705


----------------------------------------------------------------------------------------------------------


ELAPSED SIMULATION TIME  3600.   SECS  ( 4.1667E-02 DAYS   , 1.1416E-04 YEARS )
*********************************************************************************

TIME STEP NUMBER    1    NUMBER OF OUTER ITERATIONS   1    CURRENT TIME STEP  1.000    SECS


COMP-  1  GLOBAL RADIONUCLIDE CONCENTRATION (FRACTION)
...................................................

  All values for this array equal  0.0000E+00
```

AQUIFER INFLUX RATES (POSITIVE-IN : NEGATIVE-OUT)

INFLUENCE BLK NO	1	2	3	4	5	6	7	8	9
BLOCK (I,J,K)	(1, 1, 1)(	1, 2, 1)(	1, 3, 1)(	1, 4, 1)(	1, 5, 1)(	40, 1, 1)(	40, 2, 1)(	40, 3, 1)(	40, 4, 1)
FLUID (KG/SEC)	3.852E+00	3.852E+00	3.852E+00	3.852E+00	3.852E+00	-3.852E+00	-3.852E+00	-3.852E+00	-3.852E+00
NUCL 1(KG/SEC)	0.000E+00	0.000E+00	1.541E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

INFLUENCE BLK NO	10
BLOCK (I,J,K)	(40, 5, 1)(
FLUID (KG/SEC)	-3.852E+00
NUCL 1(KG/SEC)	0.000E+00

ELAPSED SIMULATION TIME 7200. SECS (8.3333E-02 DAYS , 2.2831E-04 YEARS)
****

TIME STEP NUMBER 2 NUMBER OF OUTER ITERATIONS 0 CURRENT TIME STEP 3600. SECS

COMP- 1 GLOBAL RADIONUCLIDE CONCENTRATION (FRACTION)

	1	2	3	4	5	6	7	8	9	10
1	2.87840E-08	4.80638E-09	5.39792E-10	5.06339E-11	4.27865E-12	3.37617E-13	2.53795E-14	1.84008E-15	1.29724E-16	8.94321E-18
2	3.25046E-06	3.63272E-07	3.05840E-08	2.29144E-09	1.61034E-10	1.08674E-11	7.13155E-13	4.58518E-14	2.90232E-15	1.81463E-16
3	3.70552E-04	2.08433E-05	1.17260E-06	6.59774E-08	3.71285E-09	2.08970E-10	1.17632E-11	6.62266E-13	3.72910E-14	2.10010E-15

4	3.25046E-06	3.63272E-07	3.05840E-08	2.29144E-09	1.61034E-10	1.08674E-11	7.13155E-13	4.58518E-14	2.90232E-15	1.81463E-16
5	2.87840E-08	4.80638E-09	5.39792E-10	5.06339E-11	4.27865E-12	3.37617E-13	2.53795E-14	1.84008E-15	1.29724E-16	8.94321E-18

	11	12	13	14	15	16	17	18	19	20
1	6.05398E-19	4.03639E-20	2.65689E-21	1.72975E-22	1.11549E-23	7.13406E-25	4.52925E-26	2.85687E-27	1.79156E-28	1.11763E-29
2	1.12334E-17	6.89718E-19	4.20577E-20	2.54965E-21	1.53792E-22	9.23605E-24	5.52557E-25	3.29456E-26	1.95845E-27	1.16106E-28
3	1.18288E-16	6.66354E-18	3.75434E-19	2.11557E-20	1.19229E-21	6.72054E-23	3.78868E-24	2.13616E-25	1.20460E-26	6.79387E-28
4	1.12334E-17	6.89718E-19	4.20577E-20	2.54965E-21	1.53792E-22	9.23605E-24	5.52557E-25	3.29456E-26	1.95845E-27	1.16106E-28
5	6.05398E-19	4.03639E-20	2.65689E-21	1.72975E-22	1.11549E-23	7.13406E-25	4.52925E-26	2.85687E-27	1.79156E-28	1.11763E-29

	21	22	23	24	25	26	27	28	29	30
1	6.93928E-31	4.29009E-32	2.64191E-33	1.62111E-34	9.91460E-36	6.04532E-37	3.67572E-38	2.22913E-39	1.34857E-40	8.14013E-42
2	6.86671E-30	4.05220E-31	2.38654E-32	1.40300E-33	8.23436E-35	4.82547E-36	2.82384E-37	1.65036E-38	9.63381E-40	5.61739E-41
3	3.83224E-29	2.16197E-30	1.21986E-31	6.88383E-33	3.88519E-34	2.19309E-35	1.23811E-36	6.99077E-38	3.94775E-39	2.22964E-40
4	6.86671E-30	4.05220E-31	2.38654E-32	1.40300E-33	8.23436E-35	4.82547E-36	2.82384E-37	1.65036E-38	9.63381E-40	5.61739E-41
5	6.93928E-31	4.29009E-32	2.64191E-33	1.62111E-34	9.91460E-36	6.04532E-37	3.67572E-38	2.22913E-39	1.34857E-40	8.14013E-42

	31	32	33	34	35	36	37	38	39	40
1	4.90312E-43	2.94750E-44	1.76861E-45	1.05938E-46	6.33516E-48	3.78261E-49	2.25523E-50	1.34273E-51	7.98405E-53	4.80332E-54
2	3.27207E-42	1.90411E-43	1.10706E-44	6.43109E-46	3.73299E-47	2.16525E-48	1.25504E-49	7.26982E-51	4.20850E-52	2.46586E-53
3	1.25944E-41	7.11509E-43	4.02015E-44	2.27176E-45	1.28392E-46	7.25729E-48	4.10267E-49	2.31961E-50	1.31167E-51	7.51046E-53
4	3.27207E-42	1.90411E-43	1.10706E-44	6.43109E-46	3.73299E-47	2.16525E-48	1.25504E-49	7.26982E-51	4.20850E-52	2.46586E-53
5	4.90312E-43	2.94750E-44	1.76861E-45	1.05938E-46	6.33516E-48	3.78261E-49	2.25523E-50	1.34273E-51	7.98405E-53	4.80332E-54

AQUIFER INFLUX RATES (POSITIVE-IN : NEGATIVE-OUT)
....

INFLUENCE BLK NO	1	2	3	4	5	6	7	8	9
BLOCK (I,J,K)	(1, 1, 1)	(1, 2, 1)	(1, 3, 1)	(1, 4, 1)	(1, 5, 1)	(40, 1, 1)	(40, 2, 1)	(40, 3, 1)	(40, 4, 1)

FLUID (KG/SEC) 3.852E+00 3.852E+00 3.852E+00 3.852E+00 3.852E+00 -3.852E+00 -3.852E+00 -3.852E+00 -3.852E+00
NUCL 1(KG/SEC) 1.109E-07 1.252E-05 1.428E-03 1.252E-05 1.109E-07 -1.850E-53 -9.500E-53 -2.893E-52 -9.500E-53

INFLUENCE BLK NO 10
BLOCK (I,J,K) (40, 5, 1)(
FLUID (KG/SEC) -3.852E+00
NUCL 1(KG/SEC) -1.850E-53

*** RECURRENT DATA SPECIFICATION BEGINNING AT TIME = 7200. (SECS) ***

INPUT CONTROL OPTIONS

INDQ	IWELL	IMETH	ITHRU	IRSS	IPROD	IOPT	INDT	ICLL	IRCH	ICHCR
0	0	0	0	0	0	0	0	0	0	0

TIME STEPPING AND OUTPUT CONTROL OPTIONS

TCHG	DT	IO1	IO2	IO3	IO4	IO5	IO6	IO8	RSTWR	MAP	MDAT	IIPRT	IO5D	IO8D	IIPRTD
3.421E+05	3.600E+03	-1	-1	1	-1	1	-1	0	0	0	0	3	0	-1	0

RADIONUCLIDE TIME STEP CONTROL - MAX CONC. CHANGE PER TIME STEP = 3.600E+03

ELAPSED SIMULATION TIME 3.4214E+05 SECS (3.960 DAYS , 1.0849E-02 YEARS)
****

TIME STEP NUMBER 95 NUMBER OF OUTER ITERATIONS 0 CURRENT TIME STEP 3744. SECS

*** GLOBAL (FRACTURE) DEPENDENT VALUES ***

GLOBAL PRESSURE AT ELEVATION (PA)

	1	2	3	4	5	6	7	8	9	10
1	1.93688E+06	1.88785E+06	1.83881E+06	1.78978E+06	1.74074E+06	1.69171E+06	1.64267E+06	1.59364E+06	1.54460E+06	1.49557E+06
2	1.93688E+06	1.88785E+06	1.83881E+06	1.78978E+06	1.74074E+06	1.69171E+06	1.64267E+06	1.59364E+06	1.54460E+06	1.49557E+06
3	1.93688E+06	1.88785E+06	1.83881E+06	1.78978E+06	1.74074E+06	1.69171E+06	1.64267E+06	1.59364E+06	1.54460E+06	1.49557E+06
4	1.93688E+06	1.88785E+06	1.83881E+06	1.78978E+06	1.74074E+06	1.69171E+06	1.64267E+06	1.59364E+06	1.54460E+06	1.49557E+06
5	1.93688E+06	1.88785E+06	1.83881E+06	1.78978E+06	1.74074E+06	1.69171E+06	1.64267E+06	1.59364E+06	1.54460E+06	1.49557E+06

	11	12	13	14	15	16	17	18	19	20
1	1.44653E+06	1.39750E+06	1.34846E+06	1.29943E+06	1.25039E+06	1.20136E+06	1.15232E+06	1.10329E+06	1.05425E+06	1.00522E+06
2	1.44653E+06	1.39750E+06	1.34846E+06	1.29943E+06	1.25039E+06	1.20136E+06	1.15232E+06	1.10329E+06	1.05425E+06	1.00522E+06
3	1.44653E+06	1.39750E+06	1.34846E+06	1.29943E+06	1.25039E+06	1.20136E+06	1.15232E+06	1.10329E+06	1.05425E+06	1.00522E+06
4	1.44653E+06	1.39750E+06	1.34846E+06	1.29943E+06	1.25039E+06	1.20136E+06	1.15232E+06	1.10329E+06	1.05425E+06	1.00522E+06
5	1.44653E+06	1.39750E+06	1.34846E+06	1.29943E+06	1.25039E+06	1.20136E+06	1.15232E+06	1.10329E+06	1.05425E+06	1.00522E+06

	21	22	23	24	25	26	27	28	29	30
1	9.56183E+05	9.07148E+05	8.58113E+05	8.09078E+05	7.60043E+05	7.11008E+05	6.61973E+05	6.12938E+05	5.63903E+05	5.14868E+05
2	9.56183E+05	9.07148E+05	8.58113E+05	8.09078E+05	7.60043E+05	7.11008E+05	6.61973E+05	6.12938E+05	5.63903E+05	5.14868E+05
3	9.56183E+05	9.07148E+05	8.58113E+05	8.09078E+05	7.60043E+05	7.11008E+05	6.61973E+05	6.12938E+05	5.63903E+05	5.14868E+05
4	9.56183E+05	9.07148E+05	8.58113E+05	8.09078E+05	7.60043E+05	7.11008E+05	6.61973E+05	6.12938E+05	5.63903E+05	5.14868E+05
5	9.56183E+05	9.07148E+05	8.58113E+05	8.09078E+05	7.60043E+05	7.11008E+05	6.61973E+05	6.12938E+05	5.63903E+05	5.14868E+05

	31	32	33	34	35	36	37	38	39	40
1	4.65833E+05	4.16798E+05	3.67763E+05	3.18728E+05	2.69693E+05	2.20658E+05	1.71623E+05	1.22588E+05	73553.	24518.

2	4.65833E+05	4.16798E+05	3.67763E+05	3.18728E+05	2.69693E+05	2.20658E+05	1.71623E+05	1.22588E+05	73553.	24518.
3	4.65833E+05	4.16798E+05	3.67763E+05	3.18728E+05	2.69693E+05	2.20658E+05	1.71623E+05	1.22588E+05	73553.	24518.
4	4.65833E+05	4.16798E+05	3.67763E+05	3.18728E+05	2.69693E+05	2.20658E+05	1.71623E+05	1.22588E+05	73553.	24518.
5	4.65833E+05	4.16798E+05	3.67763E+05	3.18[illegible]E+05	2.69693E+05	2.20658E+05	1.71623E+05	1.22588E+05	73553.	24518.

GLOBAL PRESSURE AT DATUM (PA)

....

	1	2	3	4	5	6	7	8	9	10
1	1.93688E+06	1.88785E+06	1.83881E+06	1.78978E+06	1.74074E+06	1.69171E+06	1.64267E+06	1.59364E+06	1.54460E+06	1.49557E+06
2	1.93688E+06	1.88785E+06	1.83881E+06	1.78978E+06	1.74074E+06	1.69171E+06	1.64267E+06	1.59364E+06	1.54460E+06	1.49557E+06
3	1.93688E+06	1.88785E+06	1.83881E+06	1.78978E+06	1.74074E+06	1.69171E+06	1.64267E+06	1.59364E+06	1.54460E+06	1.49557E+06
4	1.93688E+06	1.88785E+06	1.83881E+06	1.78978E+06	1.74074E+06	1.69171E+06	1.64267E+06	1.59364E+06	1.54460E+06	1.49557E+06
5	1.93688E+06	1.88785E+06	1.83881E+06	1.78978E+06	1.74074E+06	1.69171E+06	1.64267E+06	1.59364E+06	1.54460E+06	1.49557E+06

	11	12	13	14	15	16	17	18	19	20
1	1.44653E+06	1.39750E+06	1.34846E+06	1.29943E+06	1.25039E+06	1.20136E+06	1.15232E+06	1.10329E+06	1.05425E+06	1.00522E+06
2	1.44653E+06	1.39750E+06	1.34846E+06	1.29943E+06	1.25039E+06	1.20136E+06	1.15232E+06	1.10329E+06	1.05425E+06	1.00522E+06
3	1.44653E+06	1.39750E+06	1.34846E+06	1.29943E+06	1.25039E+06	1.20136E+06	1.15232E+06	1.10329E+06	1.05425E+06	1.00522E+06
4	1.44653E+06	1.39750E+06	1.34846E+06	1.29943E+06	1.25039E+06	1.20136E+06	1.15232E+06	1.10329E+06	1.05425E+06	1.00522E+06
5	1.44653E+06	1.39750E+06	1.34846E+06	1.29943E+06	1.25039E+06	1.20136E+06	1.15232E+06	1.10329E+06	1.05425E+06	1.00522E+06

	21	22	23	24	25	26	27	28	29	30
1	9.56183E+05	9.07148E+05	8.58113E+05	8.09078E+05	7.60043E+05	7.11008E+05	6.61973E+05	6.12938E+05	5.63903E+05	5.14868E+05
2	9.56183E+05	9.07148E+05	8.58113E+05	8.09078E+05	7.60043E+05	7.11008E+05	6.61973E+05	6.12938E+05	5.63903E+05	5.14868E+05
3	9.56183E+05	9.07148E+05	8.58113E+05	8.09078E+05	7.60043E+05	7.11008E+05	6.61973E+05	6.12938E+05	5.63903E+05	5.14868E+05
4	9.56183E+05	9.07148E+05	8.58113E+05	8.09078E+05	7.60043E+05	7.11008E+05	6.61973E+05	6.12938E+05	5.63903E+05	5.14868E+05
5	9.56183E+05	9.07148E+05	8.58113E+05	8.09078E+05	7.60043E+05	7.11008E+05	6.61973E+05	6.12938E+05	5.63903E+05	5.14868E+05

	31	32	33	34	35	36	37	38	39	40
1	4.65833E+05	4.16798E+05	3.67763E+05	3.18728E+05	2.69693E+05	2.20658E+05	1.71623E+05	1.22588E+05	73553.	24518.
2	4.65833E+05	4.16798E+05	3.67763E+05	3.18728E+05	2.69693E+05	2.20658E+05	1.71623E+05	1.22588E+05	73553.	24518.
3	4.65833E+05	4.16798E+05	3.67763E+05	3.18728E+05	2.69693E+05	2.20658E+05	1.71623E+05	1.22588E+05	73553.	24518.
4	4.65833E+05	4.16798E+05	3.67763E+05	3.18728E+05	2.69693E+05	2.20658E+05	1.71623E+05	1.22588E+05	73553.	24518.
5	4.65833E+05	4.16798E+05	3.67763E+05	3.18728E+05	2.69693E+05	2.20658E+05	1.71623E+05	1.22588E+05	73553.	24518.

GLOBAL TEMPERATURE (DEG.C)

....

All values for this array equal 21.10

GLOBAL BRINE CONCENTRATION (FRACTION)

....

All values for this array equal 0.0000E+00

COMP- 1 GLOBAL RADIONUCLIDE CONCENTRATION (FRACTION)

....

1 2 3 4 5 6 7 8 9 10

1	1.15549E-06	2.69359E-06	4.56519E-06	6.14538E-06	6.87572E-06	6.58528E-06	5.51587E-06	4.10766E-06	2.75566E-06	1.68334E-06
2	2.40454E-06	5.58932E-06	9.43058E-06	1.26239E-05	1.40345E-05	1.33493E-05	1.11006E-05	8.20495E-06	5.46246E-06	3.31113E-06
3	3.67294E-06	8.52187E-06	1.43368E-05	1.91222E-05	2.11719E-05	2.00494E-05	1.65952E-05	1.22080E-05	8.08828E-06	4.87895E-06
4	2.40454E-06	5.58932E-06	9.43058E-06	1.26239E-05	1.40345E-05	1.33493E-05	1.11006E-05	8.20495E-06	5.46246E-06	3.31113E-06
5	1.15549E-06	2.69359E-06	4.56519E-06	6.14538E-06	6.87572E-06	6.58528E-06	5.51587E-06	4.10766E-06	2.75566E-06	1.68334E-06

	11	12	13	14	15	16	17	18	19	20
1	9.44744E-07	4.90830E-07	2.37587E-07	1.07747E-07	4.60028E-08	1.85698E-08	7.11394E-09	2.59505E-09	9.04099E-10	3.01642E-10
2	1.84391E-06	9.50538E-07	4.56538E-07	2.05440E-07	8.70377E-08	3.48655E-08	1.32552E-08	4.79888E-09	1.65942E-09	5.49551E-10
3	2.70375E-06	1.38700E-06	6.62940E-07	2.96885E-07	1.25179E-07	4.99071E-08	1.88851E-08	6.80549E-09	2.34255E-09	7.72288E-10
4	1.84391E-06	9.50538E-07	4.56538E-07	2.05440E-07	8.70377E-08	3.48655E-08	1.32552E-08	4.79888E-09	1.65942E-09	5.49551E-10
5	9.44744E-07	4.90830E-07	2.37587E-07	1.07747E-07	4.60028E-08	1.85698E-08	7.11394E-09	2.59505E-09	9.04099E-10	3.01642E-10

	21	22	23	24	25	26	27	28	29	30
1	9.66116E-11	2.97707E-11	8.84398E-12	2.53749E-12	7.04354E-13	1.89446E-13	4.94440E-14	1.25386E-14	3.09336E-15	7.43286E-16
2	1.74725E-10	5.34511E-11	1.57649E-11	4.49113E-12	1.23790E-12	3.30644E-13	8.57041E-14	2.15867E-14	5.28994E-15	1.26268E-15
3	2.44450E-10	7.44532E-11	2.18642E-11	6.20216E-12	1.70233E-12	4.52809E-13	1.16890E-13	2.93231E-14	7.15727E-15	1.70172E-15
4	1.74725E-10	5.34511E-11	1.57649E-11	4.49113E-12	1.23790E-12	3.30644E-13	8.57041E-14	2.15867E-14	5.28994E-15	1.26268E-15
5	9.66116E-11	2.97707E-11	8.84398E-12	2.53749E-12	7.04354E-13	1.89446E-13	4.94440E-14	1.25386E-14	3.09336E-15	7.43286E-16

	31	32	33	34	35	36	37	38	39	40
1	1.74136E-16	3.98167E-17	8.89385E-18	1.94243E-18	4.15133E-19	8.68871E-20	1.78223E-20	3.58523E-21	7.07991E-22	1.42325E-22
2	2.93886E-16	6.67638E-17	1.48179E-17	3.21585E-18	6.83008E-19	1.42074E-19	2.89653E-20	5.79183E-21	1.13695E-21	2.27183E-22
3	3.94546E-16	8.92911E-17	1.97436E-17	4.26905E-18	9.03404E-19	1.87246E-19	3.80402E-20	7.58002E-21	1.48288E-21	2.95277E-22
4	2.93886E-16	6.67638E-17	1.48179E-17	3.21585E-18	6.83008E-19	1.42074E-19	2.89653E-20	5.79183E-21	1.13695E-21	2.27183E-22
5	1.74136E-16	3.98167E-17	8.89385E-18	1.94243E-18	4.15133E-19	8.68871E-20	1.78223E-20	3.58523E-21	7.07991E-22	1.42325E-22

```
NORMAL TERMINATION   (ITIME =   95 ; TIME = 3.4214E+05 )
     CPU elapsed time =  21.26     seconds
```

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*

2. REPORT DATE
April 1995

3. REPORT TYPE AND DATES COVERED
Final report

4. TITLE AND SUBTITLE
Evaluation of SWIFT/486 Model with Analytical Solutions

5. FUNDING NUMBERS

6. AUTHOR(S)
Mansour Zakikhani

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
U.S. Army Engineer Waterways Experiment Station
3909 Halls Ferry Road
Vicksburg, MS 39180-6199

8. PERFORMING ORGANIZATION REPORT NUMBER
Technical Report
EL-95-17

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Environmental Center
Aberdeen Proving Ground, MD 21010-5401

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES
Available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

12a. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*
This report describes the evaluation of SWIFT/486 by comparing computed results with six selected analytical solutions for several flow and solute transport scenarios of varying boundary conditions and solute sources in porous media. SWIFT/486 (Sandia Waste-Isolation Flow and Transport) is a three-dimensional, finite-difference code which can be used to simulate steady-state or transient flow and transport of chemicals (including brine and radionuclide) and heat in porous or fractured geologic media. The geologic media may be homogeneous, isotropic, heterogeneous, and/or anisotropic. The transport processes which may be modeled by SWIFT/486 include advection, dispersion, sorption, decay, and leaching. Fluid flow of variable densities and/or viscosities also may be modeled by SWIFT/486. Either a radial or Cartesian coordinate system can be used for domain discretization. The present version of SWIFT/486 is classified as a single phase and saturated flow model. The evaluation performed here complements previous SWIFT evaluations and applications. The model also was reviewed for efficiency of coding, convenience of input/output, program portability, and available diagnostic messages. Note that although only part of the above evaluation steps are described in detail in this report, the conclusions for all are given. Overall, SWIFT/486 is a relatively efficient code, requires optimal amount of computer storage, and has sufficient diagnostic flags. SWIFT/486 simulations matched closely the analytical solutions to several simplified problems.

14. SUBJECT TERMS
Groundwater
Model evaluation
Modeling
SWIFT/486

15. NUMBER OF PAGES
314

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
UNCLASSIFIED	UNCLASSIFIED		

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18
298-102